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Electrical World

Published by McGraw-Hill Publishing Company, Inc.
W. H. ONKEN, JR.
Editor

VOLUME 89 — *New York, Saturday, January 1, 1927* — NUMBER 1

Prosperous and Progressive

IF CONDITIONS in the electrical industry during 1927 shall be as good as they were in 1926—and they ought to be, and probably will be, better—every one connected with the business should be happy. A review of the year just closed shows the electric light and power industry in a prosperous condition, the electric railway industry on the road to recovery, the telephone, telegraph and radio systems still expanding, and manufacturers and distributors of electrical apparatus and supplies enjoying the results of the upward trend in the whole public utility field.

Material growth was expected; it has become a commonplace. Especially gratifying, therefore, is the clear evidence that this growth has been accompanied by a greater recognition of civic obligations and by a sounder business philosophy. A clearer conception of the industry as it relates to all other businesses and to society is manifest. There is less evidence of contentment with conditions as they are, and there are many signs of inclination and resolution to grasp the opportunities that exist for better business and better service. Toward that goal all branches of the public utility industry seem to direct their course.

The electric light and power industry, because of the nature of its service, has the brightest future of all. It reaches out into national life in greater degree, it has more intimate relations with the prosperity and comfort of the people, and there is perhaps a greater appreciation of its product. And yet, in spite of unprecedented growth, the light and power industry realizes that there is a tremendous market awaiting development. New uses for electricity are being constantly introduced, and thereby new opportunities for national service are created. Besides, there is a constant elevation of standards. Better commercial lighting means better-lighted streets, and better-lighted streets call for better-lighted homes. The electric toaster presages an electric range, which in turn paves the way for the electric refrigerator and water heater. Industrially there is no withstanding the economic appeal of the motor, the furnace, the heater and the lamp. Almost revolutionary are the changes in product and output which their use brings about.

THE consolidation of utility properties to achieve economies, the interconnection of systems to reduce operating costs, the formation of financial holding groups in order to raise money at low rates by pooling credits and many similar tendencies have been continued. Each activity of this character has called for changes in methods of doing business and for a reorganization of man power in order that the industry may function more efficiently. Major economies have been introduced in the operation of systems, and the savings resulting therefrom have been shared with the public.

The light and power industry has long recognized that good service, honesty and courtesy are the foundation stones of good public relations, and as a result of following such a policy it lives amicably and peacefully with customer and politician alike. Throughout the country efforts to develop rural service and to sell securities to customers have resulted in public approbation. Regulation of energy transmitted across state borders through agreements arrived at by the several state commissions concerned has been accepted as good policy. A sales program is now under way which calls for larger organization, more competent commercial staff and keener study of sales methods. This work will require the full co-operative efforts of manufacturers, jobbers, contractor-dealers and central-station commercial departments. Better rate systems, a maximum of sales outlets, skilled and competent salesmen, economically produced and distributed apparatus and appliances and all other agencies necessary to the success of the enlarged program are being developed.

IN THE realm of communication the achievements of the Bell system are set forth clearly and ably in this issue. Telephony remains the backbone of communication service and the Bell management continues its forward stride. New services and better standards remain the goals. Radio, the lusty infant of the communication industry, has had its ups and downs and now faces the necessity for some restriction on broadcasting if the public is to receive the best service. Congress has already had its attention called to the chaotic condition, and no doubt remedial legislation will follow. In other respects the radio industry has grown into stability and renders a greatly enjoyed and rapidly extending service.

Electrical manufacturers are keenly alive to commercial possibilities. They are studying markets and production and measuring the value of statistics and cost accounting as guides to business success. Unit organization has been brought about, as well as joint co-operation with other branches of the industry. Leadership is being exhibited which bids fair to enhance greatly the prosperity of the manufacturers and which should keep the industry stable in the ebb and flow of business tides.

Existing trends, feats accomplished and work in progress all prove that the whole electrical industry embarks on the new year with courage and confidence, with knowledge that the good year just passed can be excelled, with a realization that what lies before is far greater than that which has passed.

Statistics and Their Use

THE value of statistics lies in the fact that they epitomize past performances and serve to guide future developments. In large measure it is the indications of trend rather than the column totals that are the most valuable as measures of industry progress. Unit yardsticks of past performance can be used to gage the operations of each year and to set the scale for the ultimate business developments. Used intelligently, statistics act as eyes to focus opportunities and as nerves to co-ordinate and consolidate executive thought.

Electrical men are fortunate in their statistical information. They work in an industry which has measurements of precision as a basis of its activities. Their science deals with an invisible agency whose manifestations are made evident through such measurements. Their revenues are based on precise values and their operations are predicated on a quantitative knowledge of performances. In this issue of the ELECTRICAL WORLD the electrical industry has presented information of great value to every one. Cheerfully and willingly the utility companies and manufacturers have tabulated their business performances and sent them to the editors for summation and analysis. Returns were remarkable in that they were from 75 to 95 per cent complete for each bit of statistical information requested.

It is expected that these data will not only help the industry at large in performing its task but will also help each unit in the industry to do a better and at the same time more profitable job. The unit data, the total data, the curves of trends, the individual analyses all carry in the background the opportunity of each operating entity in the industry to use business information and to capitalize on the experiences and performance of others. The intelligent use of statistics of this character requires labor, study and a perspective by each electrical man in order for him to better his business. The printed pages form the text, but the student must study and apply the accumulated information and the principles which it illustrates in order to benefit.

Cost of Modern Stations Affords Food for Thought

CONSIDERING some of the large modern steam generating stations which have been placed in operation within the last few years, it is surprising to observe what a small proportion of the total cost the purely electrical equipment constitutes and how large the structural investment is. As might be expected by any one who has built generating stations, the relative proportions of the component costs vary greatly with conditions. But if modern stations are viewed as a group, the structural expense (including foundations, circulating-water tunnels, etc.) comes close to 40 per cent of the total cost, with the mechanical equipment exclusive of turbines and auxiliaries more than 25 per cent, turbo-generators and electrical equipment making up the remainder. In individual cases the structural expense has run to 45 per cent of the total; in others the mechanical equipment (with the exclusions mentioned) has attained 30 per cent; in still others the turbo-generators and electrical equipment have reached 40 per cent.

The most striking observation is that the equipment of modern stations, even those having powdered-fuel combustion, steam bleeding, etc., does not increase the cost per kilowatt as much as might be expected. Based on the average unit cost of the stations, the extreme low-price and high-price stations depart from the average only about 25 and 20 per cent respectively, with most of the station costs within 10 per cent of the average. Despite differences in the initial cost of these stations, the total production expenses, including investment charges, lie very close together, indicating very careful economic balances. After maintenance expenses begin to show up and station load factors change, perhaps some of these stations will stand out above their contemporaries.

Since structural investment is such a large item, it suggests the question to engineers, manufacturers and those who appropriate the money for large modern generating stations, "Can new ideas be developed for the layout of stations and can equipment be made available therefor which will reduce the structural investment more than the other investments may be increased and thus reduce the unit costs of these monuments of economy in production?" In any event a more fluid exchange of itemized costs among operating companies, if accompanied by interpretations of the conditions involved, should be of great benefit to engineers in their task of getting more out of the dollar. But until there is more general agreement as to the sub-classification of power-plant costs there will be great difficulty in getting the maximum advantage out of such analyses.

Where Shall Economies Be Concentrated?

IF ECONOMIES as great could be effected in other parts of a utility system as have been accomplished in the generation of power, there would probably be no parallel to the over-all efficiency that would exist in this industry. Except for systems in which the net revenue is chiefly from large industrial load, however, it is questionable whether efforts should be concentrated for the next few years on achieving greater production economy than is obtainable in recent modern stations. The same effort expended elsewhere might net greater system savings.

For example, every utility man will admit that if the energy-production cost were wiped out entirely, it would hardly affect the domestic-service cost. On the other hand, the revenue from large industrial customers may have a very large energy-cost component, because the unit costs of securing, handling and serving this class of customer are considerably less than for a domestic customer. Consequently, if industrial load constituted 100 per cent of the total utility load, it might be conceivable that all economic efforts should be concentrated on power-production costs, whereas if domestic load were the only load, economies would be needed chiefly beyond the switchboard—in distribution, metering, obtaining new business, servicing and handling accounts.

With the great opportunities afforded for production economies in the replacement of uneconomical stations by modern economical stations, it appears that attention can be beneficially focused elsewhere for a time—never forgetting production, of course. Just where this attention shall rest will have to be decided

by relative comparisons, on some unit basis if possible, of combined fixed and operating costs of different functions. General comparisons may indicate the functions that deserve attention, but subdivisions of costs will usually be necessary eventually. Some questions which may or may not produce enlightening answers are:

1. How many employees and how large an operating expense are involved per customer for different functions, compared with other companies?

2. How much building and office-equipment investment is involved per customer for different functions, compared with other companies?

3. Would decentralization of some functions be productive of economies?

4. Is money being denied certain investigational and planning work that would save the making of costly changes later?

5. Has reduction of special-equipment needs and the distribution rather than the lumping of purchases been carried as far as is feasible to reduce prices by improving manufacturers' load factor?

6. Have departmental and individual efficiencies been improved by modifying and co-ordinating functional activities as much as machine efficiency has been improved?

7. Are construction labor costs being minimized by concentrating responsibility on foremen and employing labor-saving devices?

8. Is available office equipment used that will reduce the cost of general office functions like billing, accounting, filing, etc.?

9. Is domestic consumption being stimulated to make distribution and handling expenses a smaller percentage of domestic service cost?

How Brooklyn Makes Good Public Relations Better

TO HAVE good will a utility company must practice it. What higher form of service can an electric light and power company render the community than diligently to apply the talent it possesses toward the perfection and efficient production of its commodity and then to share the economies effected with its patrons? This has been the avowed policy of the Brooklyn Edison Company ever since Matthew S. Sloan became its president, and the result has been phenomenal. The rate reduction just announced, the fourth since 1924, reveals Mr. Sloan's faith and enthusiasm in the business and in the citizenry and public spirit of Brooklyn. It shows that from scattering blessings commensurate rewards follow, for since 1923 to the present time more than 400,000 meters have been added to the Brooklyn Edison Company's circuits, while output has increased 35 per cent and revenue 40 per cent. During that time one of the largest generating stations in existence has been erected and much of the underground distribution system rebuilt.

Mr. Sloan should feel proud of this record and prouder still of the place his company holds in the hearts of his fellow-Brooklynites. There good public relations are a fact and not a theory, and the methods whereby this happy situation has been attained might be studied with profit by many other companies in the industry.

The Conquest of the Home—Time to Organize and Act

PRESIDENT PACK of the N.E.L.A. protests in a recent statement that people who call this the electrical age are paying the power industry "an unmerited compliment in so far as the home is concerned." And he cites the fact that the present average residence consumption of one kilowatt-hour per day is only sufficient to operate five 40-watt lamps for five hours. Now let's just multiply this condition by the present estimated national total of 15,923,060 domestic customers. Next, figure in the number and variety of practical appliances that are available today and the needs of a modern standard of lighting. Then add to this the perfectly obvious present public appreciation of the usefulness of this electrical equipment in any home. And the sum of it all is a vivid picture of the tremendous commercial opportunities awaiting action by the central-station companies of America at the beginning of this year 1927.

For it is a fact that in the average household today there is an appreciation of the convenience and luxury of "doing it electrically" and a desire for electrical appliances. Then why are they not in universal use? The answer is plain. As an industry we have not yet put behind the idea of electricity in the home that pressure of promotion and that sustained selling impulse that, within the observation of each one of us, have put into every home the sewing machine, the phonograph, the camera and a dozen other articles that come to mind. The electrical industry has not yet done its selling job—that's all. And when it does take up the building of its market, with the same intelligence, resourcefulness, enthusiasm and proficiency that have been applied to the development of its vast generating and distributing systems, we shall see as splendid a commercial conquest as has been recorded in any romance of American business.

But in any major market-building enterprise there is no substitute for planning for organization and for persistent hard work. Before complete electrical equipment shall be put into every home the central-station company in every territory must face the necessity for providing:

1. An administrative sales staff to formulate policies and direct the work.

2. A selling force with adequate man power and training.

3. Market knowledge, embracing accurate and complete analysis of territory and sales data of every useful sort.

4. Thorough understanding and application of the cost and profit value of all classes of load so that creative selling may be sensibly directed.

5. A rate structure that is promotional in its influence and encourages the broader use of the service.

6. A policy of co-operation with the local trade that will stimulate and develop adequate wiring installations and every possible outlet for appliance sales.

There can be no question as to the ability of the industry to do this selling job, once it puts its mind to the work—but when will it get ready and start? While delaying, it has, in 1926, taken on the lines 1,222,550 more residence customers—inadequately wired and applianced. Every year piles up a bigger problem. Such is the commercial outlook, and the time has come to organize and act.

The Electrical Conquest of the Home

THE electrical industry is now concentrating on doing for the home what it has done for the factory. For the home, too, needs machinery and equipment to counteract the high cost of material and labor and to lighten the human burden in accord with modern ideals. Comfort and convenience, besides, are even stronger motives to inspire electrical men in this movement to put adequate wiring and complete equipment in every household.

A $20,000,000,000 Industry

Invested Capital in All Branches Is Now $19,500,000,000—Industry Spends $1,570,000,000 Yearly for New Service Facilities—Total Gross Revenue Is $5,934,000,000—High Points in Record of Progress

ELECTRICITY now forms the background for an enormous commercial enterprise in this country. The light and power branch, the street railways, the telephone business and the electrical manufacturing division combine to make an industry which has an annual gross revenue of $5,934,000,000 from sales of service and equipment. These groups have a total invested capital of $19,500,000,000 to provide service facilities, and new capital investments aggregated $1,570,000,000 in 1926.

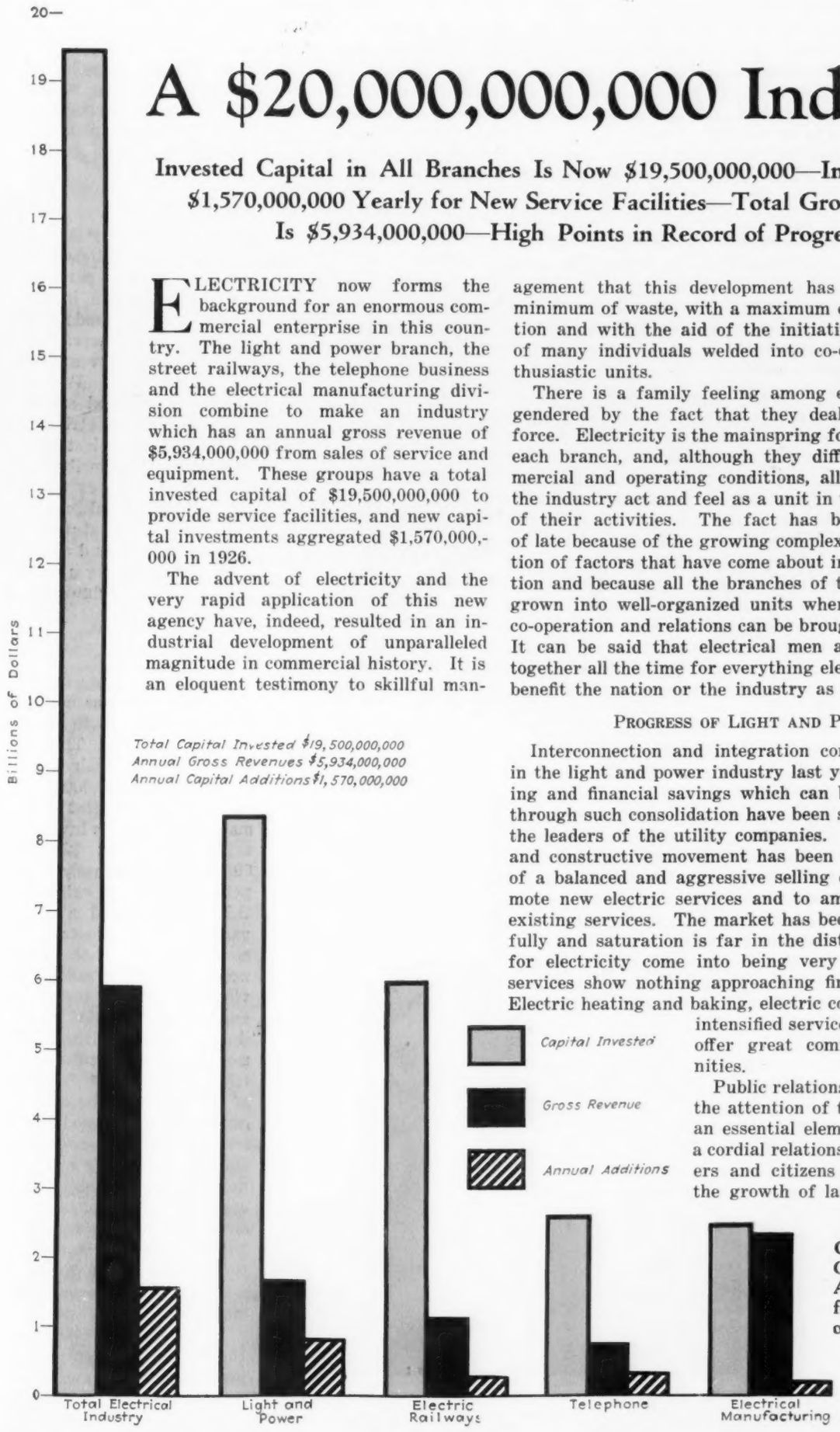
The advent of electricity and the very rapid application of this new agency have, indeed, resulted in an industrial development of unparalleled magnitude in commercial history. It is an eloquent testimony to skillful management that this development has occurred with a minimum of waste, with a maximum of public approbation and with the aid of the initiative and enterprise of many individuals welded into co-operative and enthusiastic units.

There is a family feeling among electrical men engendered by the fact that they deal with a common force. Electricity is the mainspring for the activities of each branch, and, although they differ in many commercial and operating conditions, all the branches of the industry act and feel as a unit in the larger aspects of their activities. The fact has been very evident of late because of the growing complexity and interrelation of factors that have come about in modern civilization and because all the branches of the industry have grown into well-organized units whereby inter-branch co-operation and relations can be brought about readily. It can be said that electrical men as a unit are all together all the time for everything electrical which will benefit the nation or the industry as a whole.

Progress of Light and Power

Interconnection and integration continued unabated in the light and power industry last year. The operating and financial savings which can be brought about through such consolidation have been sought eagerly by the leaders of the utility companies. Another positive and constructive movement has been the inauguration of a balanced and aggressive selling campaign to promote new electric services and to amplify the use of existing services. The market has been surveyed carefully and saturation is far in the distance. New uses for electricity come into being very rapidly and old services show nothing approaching finality of growth. Electric heating and baking, electric cooking, radio and intensified service in the homes all offer great commercial opportunities.

Public relations continue to hold the attention of this industry, for an essential element of success is a cordial relationship with customers and citizens at large. With the growth of large systems new



Capital Invested, Gross Revenue and Annual Additions for All Branches of the Electrical Industry

conditions have occurred with respect to utility regulation, and progress has been made in bringing about an extension of state regulation. This progress is in the direction of co-operative regulation by the several state commissions under whose separate jurisdictions a large interconnected system operates. Experience to date indicates this method to be very successful.

The light and power industry now has an invested capital of $8,400,000,000, an annual gross revenue of $1,684,000,000, and it generated 68,732,000,000 kw.-hr. in 1926. During the year it raised $1,395,000,000 at favorable rates for refunding and for making additions to service facilities. About $841,000,000 was the aggregate of budget expenditures on electric utility systems, a large part of this money going into distribution facilities. Economies in the production of energy have been achieved, and every effort has been made to make the industry's operations more efficient.

ELECTRIC RAILWAYS ENCOURAGED

The electric railway industry has reached bottom and is well on the way to renewed prosperity. It met an unprecedented situation with courage and solved its business problem by assimilating the bus and starting out to sell service as would a merchant. It improved the character of its service and its equipment to meet the new transportation standards set up in the minds of the people by the automobiles. It brought about greater efficiency in its operations and eliminated waste.

By adopting buses as feeders to rail transportation systems and along routes where the latter would not be economically justified, electric railways have extended their service facilities where they were much appreciated. Simultaneously this constructive move met a form of competition that appeared to some to threaten the economic continuance of street railway operation. Scrapping of old cars and substitution therefore of modern, convenient, comfortable cars has had a tendency to make people ride street cars more than formerly.

Through these means this branch of the industry has gained public approval and renewed prosperity. Public approbation now bids fair to relieve it of unfair financial burdens incorporated in existing franchises or placed there as the result of political considerations. The electric railways, according to the best estimates, have an invested capital of $6,000,000,000, a gross revenue of $1,150,000,000 per year, and carry about 14,400,000,000 revenue passengers per year on the 40,000 miles of track now used. The total operating expenses of the industry are approximately $768,000,000 and the revenue car miles are 2,460,000,000. Executives in the industry are confident of still better conditions during the coming year.

A Transmission Tower for a Mississippi River Crossing

TELEPHONE INDUSTRY PROSPEROUS

The telephone industry in this country is very largely comprised in the Bell system, which has established an enviable service and business record. Over 61 per cent of all the telephones in the world are found in the United States, and 70,000,000 calls daily are made over the 16,935,918 telephones that are now in use here. The Bell telephone system has an annual gross revenue of $761,000,000.

The industry has been managed wisely and stands high among utilities both as regards financial strength and with respect to public relations. During last year the service facilities, toll-line and machine-switching installations were extended and other developments were made. No saturation point is evident and conditions are encouraging for the year just beginning.

ELECTRICAL MANUFACTURERS ORGANIZE

The manufacturers of electrical equipment number more than 1,800, with about 400,000 employees. They do a gross annual business of about $2,375,000,000 according to the best estimates, and have an invested capital of about $2,500,000,000. An intensely competitive situation exists in this industry and a wide variety of products are manufactured. These products range from radio devices to large turbines, and this fact in itself illustrates the multitude of uses that now exist for electrical products. A feature of the year was the organization of the National Electrical Manufacturers' Association, comprising a large number of the manufacturers. This organization has already made strides in getting statistics of manufacture and in the adoption of uniform cost-accounting methods.

In general, the manufacturers have had a prosperous year and look forward to good business in the future.

Executives Say
Industry Conditions Are Sound

Opportunities Ahead Greater Than Past Accomplishments—Banker Urges Commercial Developments—Utility Executives Urge Improvements—Economist Optimistic

Four Major Tasks for 1927

By R. F. PACK
President National Electric Light Association

THE National Electric Light Association has a number of important tasks before it in 1927. It may not be able to complete them all this year, but certainly by united effort considerable progress can be made. Particular attention is demanded by the following four tasks:

1. Commercial development.
2. Merchandising of electrically operated household appliances.
3. Promotion of a better spirit and relationship between the electric light and power companies and the contractors and dealers.
4. Farm electrification.

These are separate specific subjects, but they are all more or less interconnected and interrelated.

Annual increases in the sale of electrical energy have been accomplished rather easily in years gone by. To a large extent the growth has been a natural one, but a point has been reached where real sales endeavor is going to become more and more an essential factor. This does not mean that the saturation point has been reached and that additional use of electrical energy would be unwarranted. Far from it.

No line of business has before it more legitimate opportunities. For example, there is the home using an average of only one kilowatt-hour a day—hardly sufficient for adequate lighting. Electrification of railways, the tying into our systems of inefficient individual municipal plants and the greater use of electrical energy in industry offer other opportunities. The possibilities are without limit, but their development is going to require real sales endeavor.

We should be better schooled in the merchandising of household appliances. Approximately one-half of the electric light and power companies have no appliance merchandising departments. Others only recently have entered this field of activity. Few companies have established this department on a real businesslike basis. We must get at the facts and push appliance sales. Proper sales endeavor would mean four kilowatt-hours per home per day instead of one—a much greater service to the home at a modest increase in cost.

R. F. Pack

In developing merchandise sales due regard must be given to the other fellows in the business. In many communities the relations between the companies and the contractors and dealers leave much to be desired. I am convinced from investigations I have made that there is nothing incompatible with the welfare of the contractor and dealer in the sale of electrical appliances by power companies, provided that all concerned give due consideration to the welfare of the others.

The experiments in rural electrification now being carried on in twenty-one states are providing valuable data which already have proved sufficient to warrant extension of electric service to many farming communities. The farm is being turned into a factory employing electric power for its operation and bids fair to become an acceptable customer to the power companies.

This subject is of sufficient importance to command the attention of the highest executives in our industry. Unfortunate past experiences of years gone by should be forgotten. This is a new day. Already one hundred practical uses for electricity on the farm have been developed. The next step, which is one that many progressive companies already have taken, is the establishment of rural-line departments. It is true that we cannot succeed without the active co-operation of the farmers, but it is equally true that if electricity can by intelligent use be made to pay its way on the farm, it is our obligation to acquaint the farmer with the facts. Only a rural-line department constantly abreast of the times can accomplish this task.

There are many other subjects which I could mention as important to the industry, but none which transcends those I have named. It is my hope and conviction that 1927 will witness material progress in them all.

C. C. Chesney

The Spiritual Aspect of Engineering

By C. C. CHESNEY
President American Institute of Electrical Engineers

THE second quarter of the twentieth century is well under way and its accomplishments in the electrical world promise to be fully as "eventful" as the unmatched events of the quarter just past. At home and abroad flattering forecasts are made concerning the electrical industry. All the predictions are of continuous prosperity—even more unbounded. This optimistic sentiment, emanating not only from one but from all of the many responsible sources of the world, applies not only to the business side but to the scientific side of the electrical industry—to the central-station business—the core of the industry with its investment values already

reaching the ten-billion-dollar mark—and to the possible future accomplishments of the research laboratories that have been forecast by accomplishments already given by these institutions.

The inspiration, however, of the electric light, the telephone, the X-ray, and the radio no longer thrills the public mind. These forecasts are full of hope so far as is given to fallible man to read the future, and they may well bring pride to the heart of the electrical engineering fraternity. This pride should not, however, be accompanied with that natural human tendency which goes along with optimistic prophecies—the encouragement of the idea that in some way these predictions will come true—thus breeding indifference toward individual and corporate responsibility, when in reality it is the responsibility and thought of every individual that are needed.

W. E. Creed

The electrical engineer's hopes and aspirations turn him to the future. His spirit is essentially the spirit of progress, and while he reveres the accomplishments of the past in which figures of men were more conspicuous than events, the changing conditions of modern-day civilization still leave him the embodiment of progress. Complacent satisfaction with things as they are has ever been foreign to his nature; he is constantly striving for improvement. To me the electrical engineer is the outstanding type of Western civilization; to him the ever-expanding use and development of electricity in the arts are an indication of advancing social progress. To produce constantly, to produce ever more—in this seems to him the greatest happiness and the greatest glory.

The engineer has his critics, however. By them he is credited with resourcefulness and the spirit of progression, but his critics say he is unevenly developed. He swings too much to the materialistic side, too much to the machine spirit of the age, and ignores too often the equally important phases of life represented by the cultural arts or by sociology. I am not quarreling with the critics who have such views of us. The fact that the engineer has in the past been disposed to regard his obligations somewhat narrowly is no doubt true, but during the past few years there has been developing within him a stronger sense of obligation alike to science and art and to public affairs. And, fortunately, on the part of the public, a development of a more general appreciation of the applicability of the engineer's trained capacity to the solution of public problems has also taken place.

This recognition has brought him new opportunities, and if he will now more broadly bring his individual and collective influence and his love of truth to bear on the fundamental problems of life—on the moral problems of life—we may hope that he will say, in the near future, in all humility: "I have discovered the laws of magnetic induction; I have built great generators of electricity; I have transmitted power over great distances; I have talked around the world; I have made the heavens a sounding board, and now, in addition to and above all these, I am helping to make the world better spiritually."

Sound Business in the West

By W. E. CREED
President Pacific Gas & Electric Company

CONSISTENT and steady growth in the electrical industry in California was experienced during 1926. Additions to hydro and steam generating plants were substantial without being spectacular. Extensions of service and distribution lines were in old rather than in newly opened territory. It was primarily a year of more and better service in settled areas, a year of more and better use of existing facilities. Increased business was at the rate of 10 per cent over the preceding year. This is now almost an average yearly growth. It is a sound growth, one for which the utilities must and do provide each year.

The new year comes upon us with every indication that growth will continue. As in 1926, added business will come from new industries locating on existing lines and from new uses developed by existing industries and existing consumers. It will be a year of still better and more diversified service to the consumer, one of increased and more concentrated use of facilities for the utilities. It may be a conservative year, but if that be so, it will be conservative only in so far as all other business and industry is conservative.

In the matter of public relations the industry enters 1927 well favored. It has behind it for the third time the California water and power act. It has closed a year marked by co-operation between power companies and irrigation districts in the joint development of water and power. It now has a deeper sense of responsibility to the public. It enters 1927 with the satisfaction of knowing that the people at the polls have expressed their faith anew in private management.

Steady Progress in 1927

By J. J. O'BRIEN
President H. M. Byllesby & Company

I BELIEVE that electric utility companies will continue their steady progress during 1927. Public demand for their services is still far from being satisfied. The normal growth of population alone causes a considerable annual increase in their business and the use of electric labor-saving devices in the home is increasing in remarkable volume.

The resident managers of the Byllesby properties, operating in nineteen states, report general conditions reassuring in their respective territories. Although in some instances their views of the coming year are cautiously expressed, the majority, particularly in the Middle West and Pacific Coast, look forward to a very prosperous year.

J. J. O'Brien

While we are planning construction activities conservatively for 1927, it is apparent that such expenditures will run to large totals at the Byllesby-managed properties, which are all grouped in the Standard Gas & Electric Company system. The budget will not be completed for several weeks, but final figures probably will approximate $40,000,000. Large expenditures will be made at and near Pittsburgh in providing additional electric generating capacity and increasing the natural-gas supply. At Louisville work on the 135,000-hp. hydro-electric plant on the Ohio River will be completed. Two new water powers are planned, one of 124,000 hp. capacity at Chippewa Falls, Wis., and one with an ultimate capacity of 66,000 hp. on the Rogue River in Oregon.

The popularity of utility securities among the investing public generally should continue, in my opinion, and we look for a steady increase of shareholders in the properties through operation of the customer-ownership plan of sales.

Sales the Background for Financing

By LANDON K. THORNE
President Bonbright & Company, Inc.

THE problem of raising new money for the electric power and light industry during the coming year to the amount of the $950,000,000 probably necessary is being materially simplified, I think, by the merchandising success being achieved in the appliance and refrigeration fields. The peg of personal experience is one on which every investor likes to hang his hat. Tell a man that twice as many tubes of a certain brand of toothpaste were sold this year as were sold last, and he will simply appear impressed. But if he himself has purchased twice as many

Landon K. Thorne

tubes of that paste, he'll really believe you! Now most of us are using in our homes more than twice as much electricity as we did five years ago. When you call to the attention of an investor the fact that the domestic load (generally the most profitable part of the electric company's business) in the average well-to-do home is increasing over 20 per cent each year, he will straightway remember the new coffee percolator he bought in September and the heating pad he is planning to give Aunt Emma for Christmas. These may seem trivial considerations in connection with millions of dollars of financing, but it is the yardstick of personal conviction that measures the success of a large part of all financial operations.

I do not contend that the soundness of modern utility finance is reared upon so flimsy a structure as popular fancy. Power and light securities are created, restricted and protected with maximum care and conscientious forethought. The record of such obligations bears eloquent testimony to that fact. But, although it is the first duty of the banker to create a stable and secure financial structure, it is also his job to market bonds and preferred stocks. And I do believe that the ever-increasing prominence of electric service in the homes of those who have money to invest will simplify the distribution of such securities to a marked extent.

The thought for the banker—and for companies in the industry conducting customer-ownership campaigns—to bear constantly in mind is to maintain the high standard of utility offerings.

"We are unable to find a single instance of default among bonds of companies doing a solely electric power and light business."—ELECTRICAL WORLD.

"An analysis of the dividend records of 161 electric power and light companies, representing 90 per cent of the industry, shows that current cash dividends are being paid on all of the preferred stocks, and in no cases are their back dividends unpaid."—Bonbright & Company, Inc.

The preservation of the condition reported in those two statements affords the bedrock for the foundations of our financing operations. So long as they remain true, raising money for new construction will not be difficult.

Cannot Visualize the Future

By FRANK L. DAME
President North American Company

IN LOOKING back over the amazing developments in the production and use of electric power which have occurred in the last quarter century I am struck by the kaleidoscopic changes that have made necessary so many revisions of our preconceived ideas of the limitations beyond which we could not go. The 200-kw. dynamo of 1882 becomes a pigmy beside the 100,000-kw. generator of 1926. I go back to the 550-volt line which was considered such an achievement and then note how calmly we have today put up a 220,000-volt line in California. Peak loads and fuel economies we never dreamed of are now commonplace.

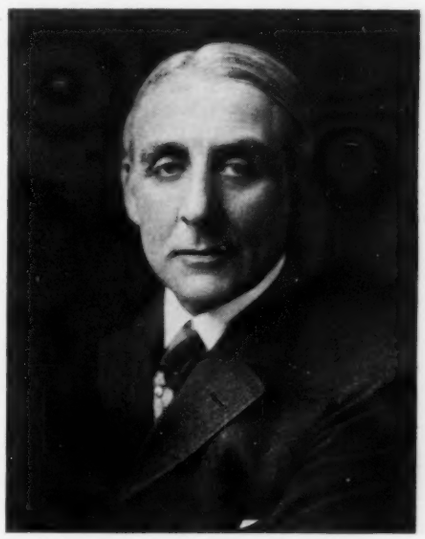
When I look back at these things and then consider how the industry has been doubling and redoubling every few years, with all past records being constantly broken, I begin to wonder what prediction can be made for the future. Our standard of measurement today may seem as poorly visioned in 1950 as was the standard of 1900, and I doubt that it is possible for any one of today to visualize the electrical industry of the future unless he would indulge in what would certainly be regarded as a wild flight of fancy.

Frank L. Dame

Protect the Future

By MARTIN J. INSULL
President Middle West Utilities Company

DURING 1926 the growth and prosperity of the three major sections of the country which the Middle West Utilities Company's operating subsidiaries serve—New England, the Middle West and the Southwest—were founded on sound fundamental conditions which give every indication of continuing through 1927.



Martin J. Insull

I conclude from conditions in our own territories that the industry, which as a whole has enjoyed an unusually successful year, may look forward to another year quite as satisfactory.

I look on the continued prosperity of the industry by no means as an occasion for reckless expansion, but rather as an opportunity to fortify and protect the future of this business of supplying services necessary to the nation's business and domestic life. We are in the midst of a period of extensive construction, greatly facilitated by the relatively easy conditions under which new projects may be financed. We must be quite as alert in justifying these capital expenditures as we are in sensing opportunities for expansion. The prosperity which is the dominant note at the threshold of 1927 can be made the background for earnest effort which by the end of the year shall have been translated into a record of accomplishment in operating economies, increased consumption and still higher standards of service.

Urges Joint State Regulation

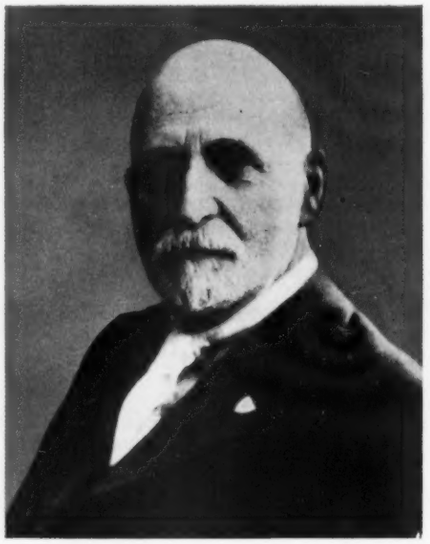
By CHARLES L. EDGAR
President Edison Electric Illuminating Company of Boston

FOR many years each light and power company confined its activity to a single municipality. Later expansion brought about state regulation in place of municipal regulation, and this, broadly speaking, has worked to the satisfaction of the companies and the public authorities. More recently interstate business has developed. Just as municipal regulation ceased to be effective when the company went beyond the city or town limits, so state regulation ceases to be effective when the company crosses the state boundary. The companies have recognized this situation for a number of years. The solution, of course, can be found either in federal regulation of interstate business or in an arrangement by which interstate business can be controlled by interstate commissions, or, to put it differently, in a concerted and co-operative action between the existing state commissions.

Our industry, as I believe, very strongly favors the latter method and much thought has been given to the best way of bringing it about. Tentative bills have been drawn by the legal departments of many companies looking toward the federal government transferring its power to the state commissions. Pending definite progress in this direction, conceivably a task of broad scope and possible complexities,

Charles L. Edgar

it has been suggested in New England that through voluntary submission by parties to interstate power contracts to regulation by commissions of adjoining states a simple method of regulation could be attained. Clauses to this effect were presented at the New England Conference in Hartford in November, and representatives of companies most actively engaged in interstate power transmission have pledged



1927 will be a good year but not a boom year, thank God.

ALEX DOW,
President Detroit Edison Company.

themselves to make use of this plan and to urge it upon all utilities not represented on the committee reporting to the New England Council.

This step is one of the most important moves of the past year in the electric light and power industry. Its significance is general, not regional. Those who have co-operated to achieve it believe that here is a means of regulating interstate power contracts which should do away with proposals from intelligent sources for federal control, and that it offers so desirable an alternative to the latter that 1927 may well witness the widespread trial of so promising an attempt to solve a most important problem.

Business Should Be Good

By COL. LEONARD P. AYRES
Vice-President Cleveland Trust Company

ANY forecast of the prospects for general business in 1927 is a difficult task and caution should be exercised. The year 1926 has been exceptionally prosperous. General business is good, and this is especially true of industry and transportation. Industrial production has been larger, the number of freight cars loaded has been greater, more steel has been made and more automobiles manufactured and sold than ever before. Even the value of new building construction may exceed that of any previous year. Employment has been general and wages have been high. The credit supply is ample, and at the present time no unwholesome welter of unsound conditions exists among the fundamentals of business. For once the country has been prosperous without getting reckless. The major reason for this is probably to be found in the fact that the trend of wholesale commodity prices during most of the past two years has been a gently declining one, although an important cause is that there has been steadily available an ample supply of credit ably administered through the Federal Reserve System.

Under existing conditions it would appear reasonable to conclude that business conditions in 1927 would probably continue to be about what they have been the past year. However, all unfavorable factors must also be fairly considered. The farmers have suffered severe disappointments. Agricultural prices are falling and getting seriously out of line with industrial prices. The automobile industry has had more than normal seasonal reduction. Building construction appears to be slowing down. The textile industry has had a poor year.

The fair balance of evidence appears to justify us in thinking it likely that general business may be somewhat slower in 1927 than it has been in 1926. It seems probable that the trend of interest rates will be an irregularly declining one. If this happens, bond prices will in all likelihood continue to advance. Financing of sound industrial and business enterprises would be possible at favorable rates. The trend of wholesale and retail prices, and of the cost of living, promises to continue to decline. Wage rates seem more likely to hold firm than to advance much. Building construction will surely be in large volume and value, but probably not so large as in either 1926 or 1925.

It seems not unlikely that the production of automobiles may be about 5 or 6 per cent less than in 1926, and there seems little prospect that important financial troubles will develop as

Col. Leonard P. Ayres

a result of the widespread practice of installment selling. Industrial profits in 1926 have been the largest in our history, and some narrowing, rather than a still further broadening, of profit margins may reasonably be anticipated next year. If most of these suggested developments come to pass, 1927 will be a pretty good business year, even if it should turn out to be somewhat slower than 1926.

Light and Power Utilities Report

Progress and Prosperity

Total Revenue $1,684,000,000 and Total Generation 68,732,000,000 Kw.-Hr.—Résumé of Operations—Financial, Administrative and Market Trends and Opportunities—68,000,000 People Live in Homes Served

DURING 1926 the light and power industry has continued to grow and expand. It generated 68,732,000,000 kw.-hr. of energy and sold 55,468,000,000 kw.-hr. to customers for the sum of $1,684,000,000. By every total and unit measuring yardstick it advanced as compared with 1925. It sold 12.4 per cent more energy; it received 11.8 per cent more revenue, and it raised $115,000,000 more money at a lower average cost than in 1925. It has continued to develop markets, improve service and extend service. It has gained a better insight into the problems it faces and has become better organized to do its work.

This branch of the electrical industry now has a capital investment as of Jan. 1, 1927, equal to $8,400,000,000. It has an installed generating capacity of 26,812,710 kva. and spent $841,344,000 for new additions to its plant facilities in 1926. Budget reports for 1927 indicate it will spend $958,000,000 during the coming year.

During 1926 it added 1,460,360 new customers to its lines and now serves a total of more than 19,500,000 customers in this country. In a few years it has become a leading industry of this country, and every evidence exists that it will continue to grow and expand during the coming years.

Approximately 68,500,000 people, or 58 per cent of the population, now live in homes served by electricity, an increase of 3.6 per cent since 1925. These homes, together with energy used for commercial lighting, used 16,400,000,000 kw.-hr. in 1926 and this energy brought in a total revenue of $1,072,000,000.

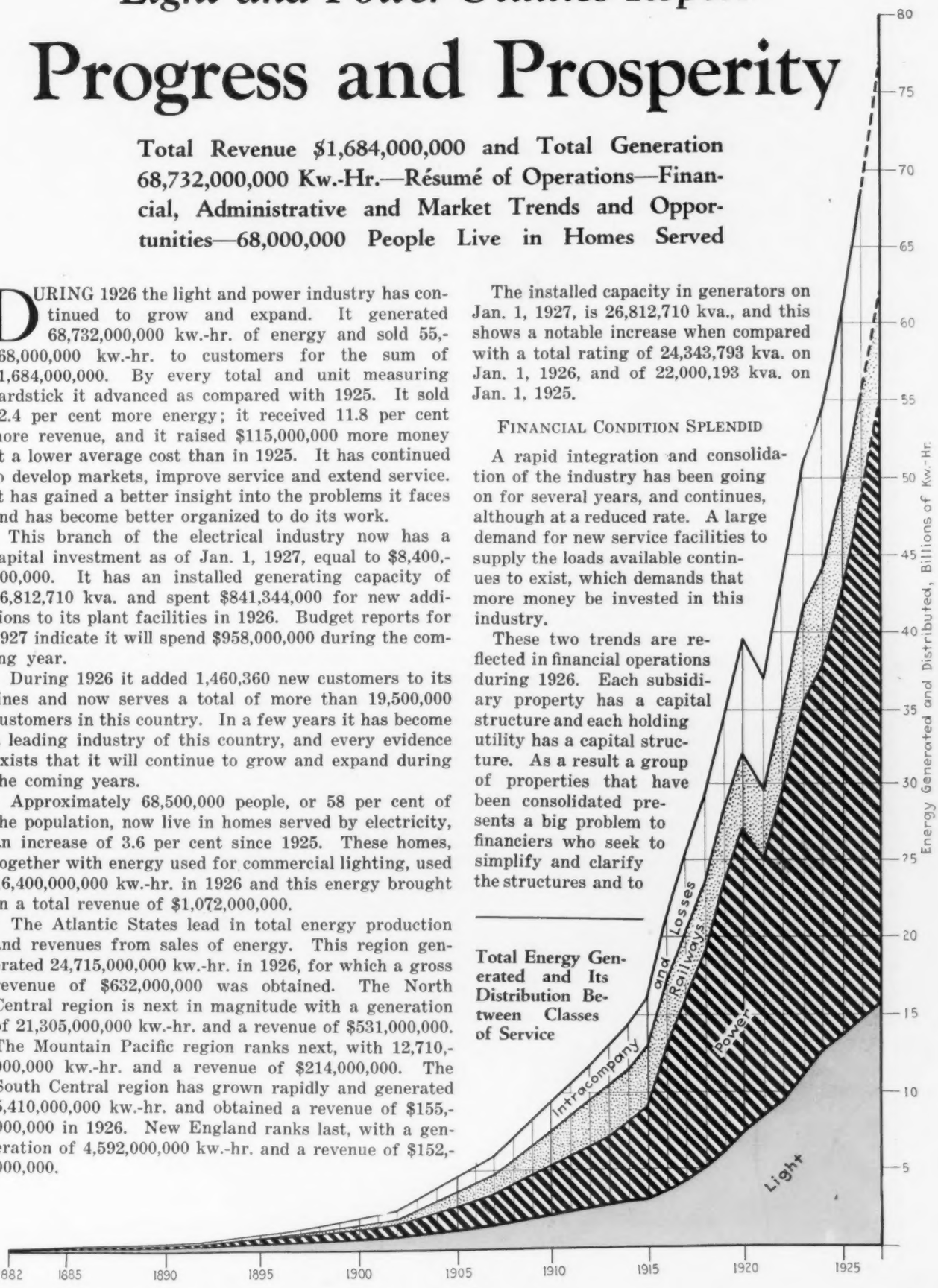
The Atlantic States lead in total energy production and revenues from sales of energy. This region generated 24,715,000,000 kw.-hr. in 1926, for which a gross revenue of $632,000,000 was obtained. The North Central region is next in magnitude with a generation of 21,305,000,000 kw.-hr. and a revenue of $531,000,000. The Mountain Pacific region ranks next, with 12,710,000,000 kw.-hr. and a revenue of $214,000,000. The South Central region has grown rapidly and generated 5,410,000,000 kw.-hr. and obtained a revenue of $155,000,000 in 1926. New England ranks last, with a generation of 4,592,000,000 kw.-hr. and a revenue of $152,000,000.

The installed capacity in generators on Jan. 1, 1927, is 26,812,710 kva., and this shows a notable increase when compared with a total rating of 24,343,793 kva. on Jan. 1, 1926, and of 22,000,193 kva. on Jan. 1, 1925.

Financial Condition Splendid

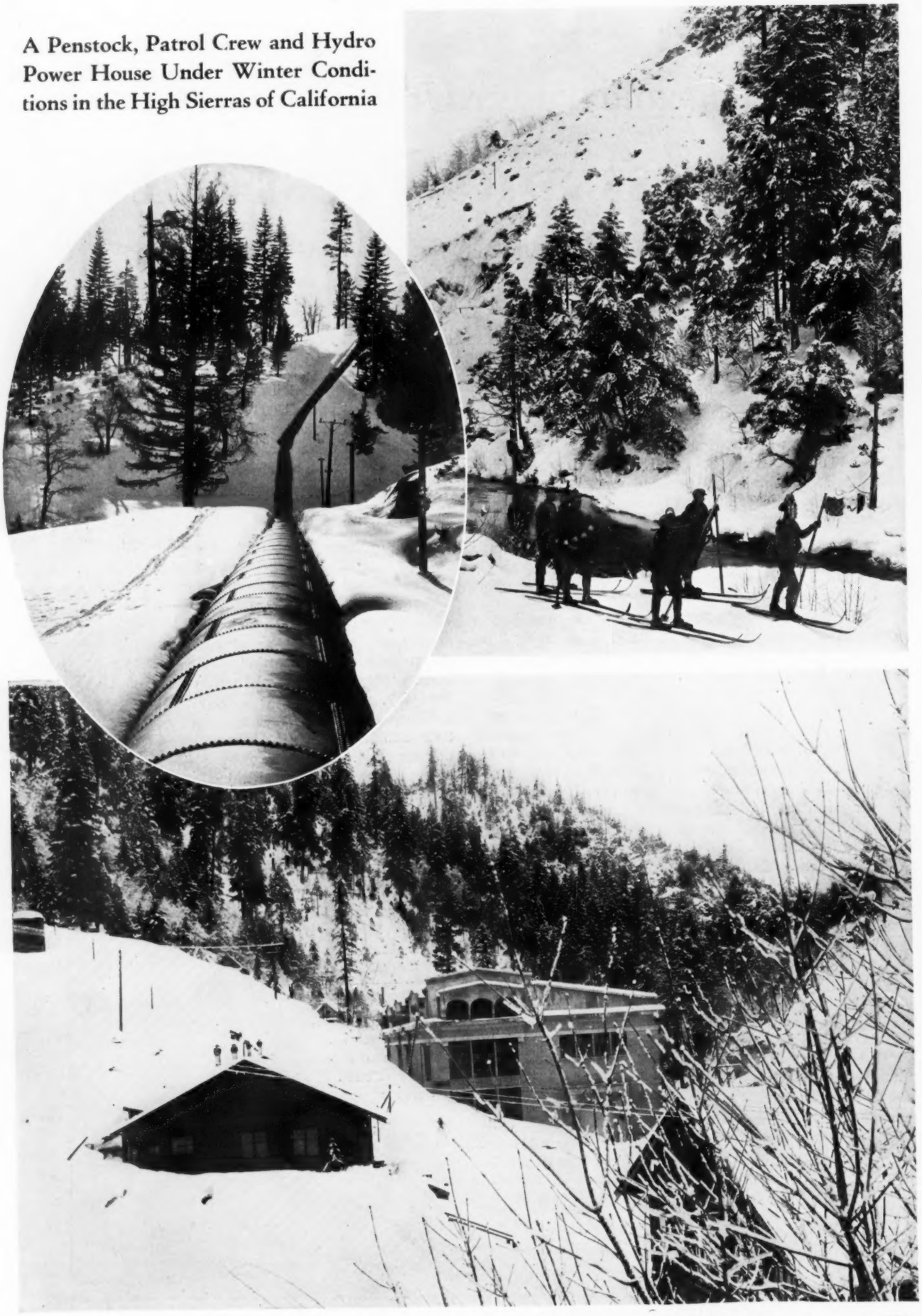
A rapid integration and consolidation of the industry has been going on for several years, and continues, although at a reduced rate. A large demand for new service facilities to supply the loads available continues to exist, which demands that more money be invested in this industry.

These two trends are reflected in financial operations during 1926. Each subsidiary property has a capital structure and each holding utility has a capital structure. As a result a group of properties that have been consolidated presents a big problem to financiers who seek to simplify and clarify the structures and to



Total Energy Generated and Its Distribution Between Classes of Service

A Penstock, Patrol Crew and Hydro Power House Under Winter Conditions in the High Sierras of California

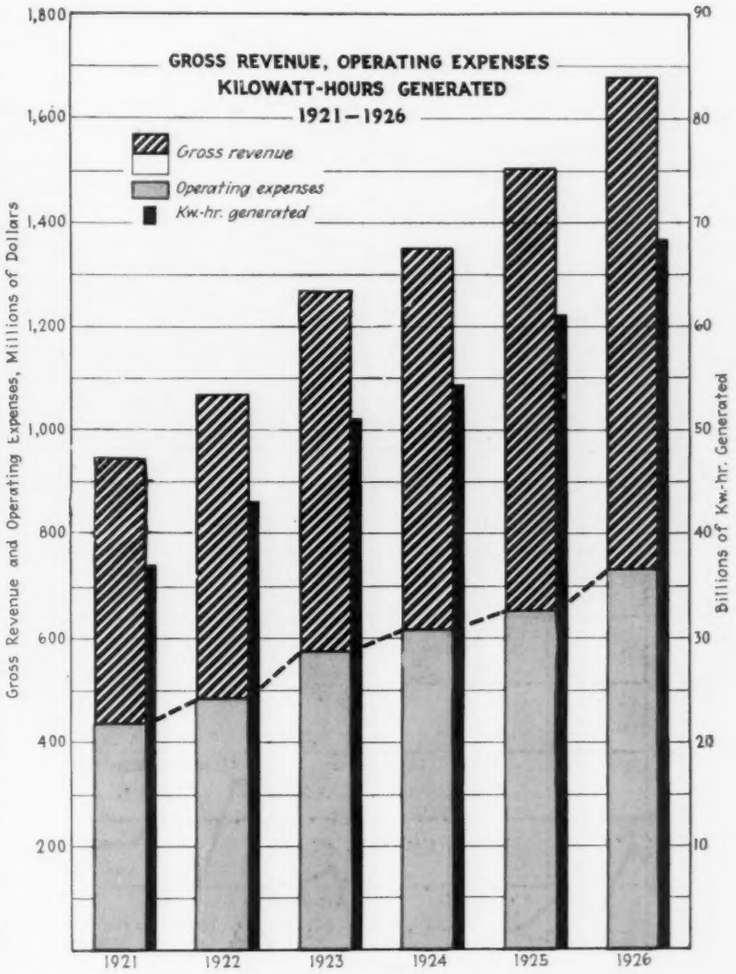


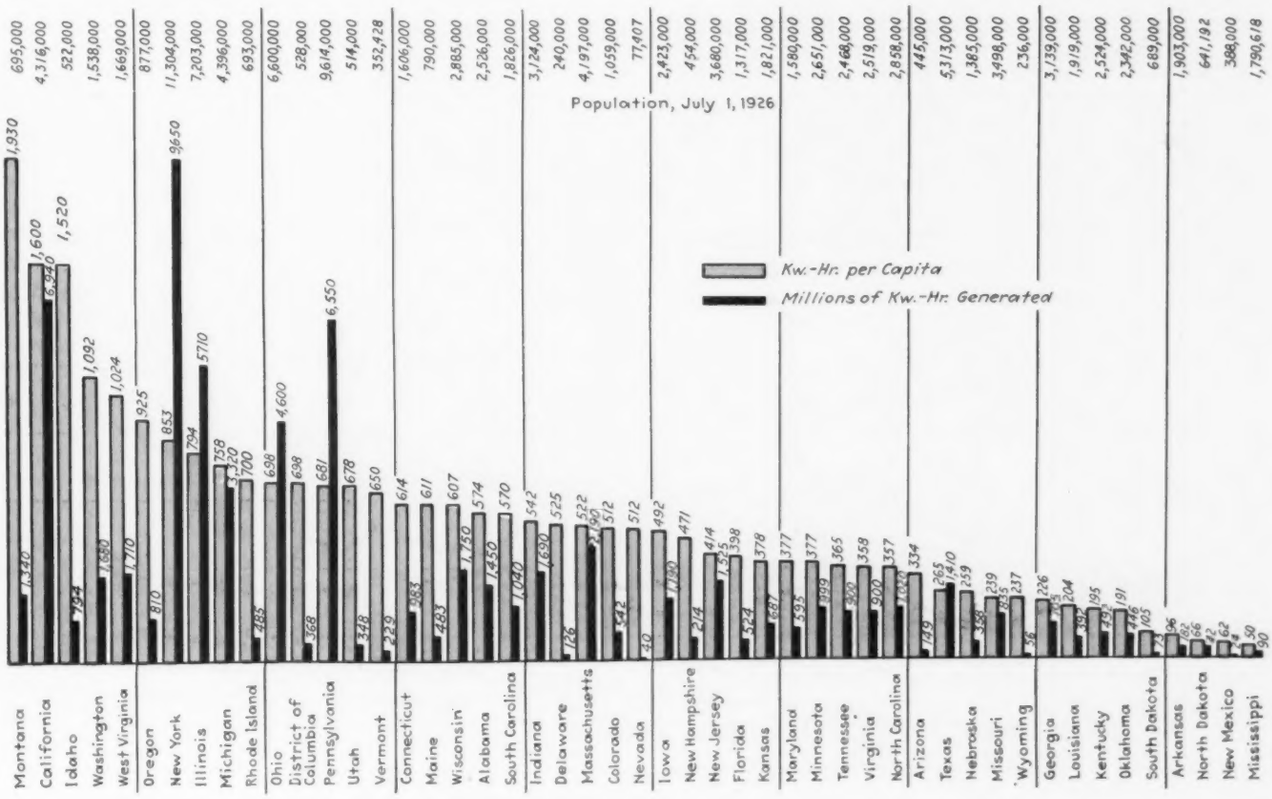
build a new one that is better and more economical. State laws, franchise clauses, the time duration of bond issues, the clauses in certain classes of securities—all these elements make it difficult to attack and solve this problem instantly.

But during 1926 measurable progress was made toward simplification, and several notable instances of this are on record in another article in this issue. Suffice it to say that progress has been made and the industry leaders know how to do the financial job confronting them. Time will be required before the task is done completely.

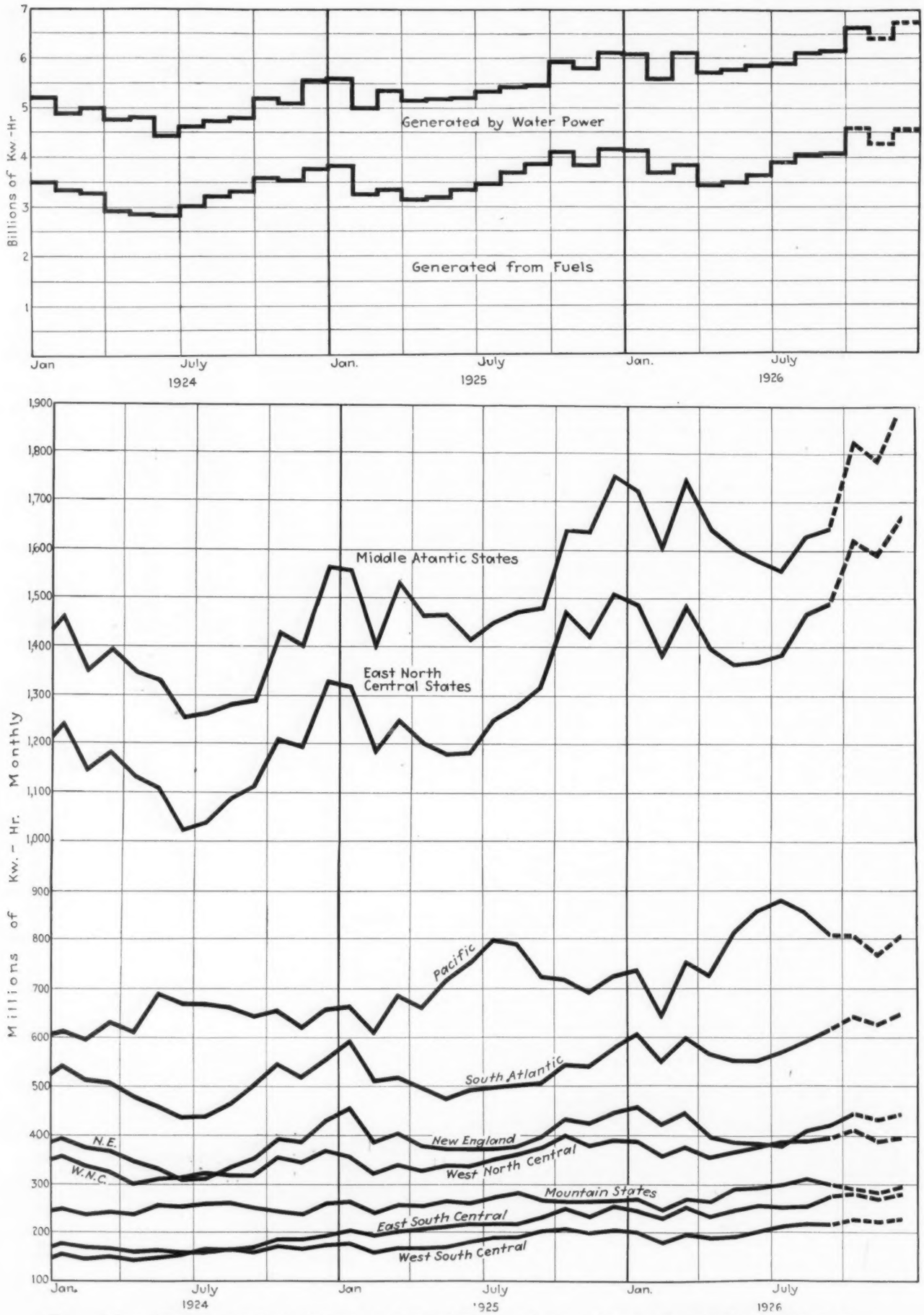
Raising money in ample amount at reasonable rates is largely a matter of credit. During 1926 the light and power utilities raised $1,395,564,982 by selling securities at very favorable rates. About $369,000,000 of this sum was for refunding and the remainder for new plant investments and other corporate purposes. So long as earnings are good and financing is sane there is no doubt that the industry will continue to be considered favorably in financial circles.

The capitalization of the industry increased from $7,500,000,000 Jan. 1, 1926, to $8,400,000,000 on Jan. 1, 1927. During 1926 a total of $813,860,000 in bonds was issued and $581,000,000 in stocks and notes. Of this sum only $11,800,000 was from common stock sales. The average yield on bonds changed from 6 per cent in 1924 to 5.4 per cent in 1926. The average yield on debentures in 1926 was 6.2 per cent and on preferred stocks 6.84 per cent. These decreased costs for capital measure the enhanced financial credit of the light and power industry.





Energy Generated in Each State and per Capita in Each State



Energy from Water and Fuel (Above) and Total Energy Generated in the Several Geographic Sections

The bond issues in 1926 aggregated 59 per cent of the total capital raised, as the industry took advantage of low money rates to do long-term financing with open-end mortgage bonds.

This movement is reflected also in customer-ownership sales, for although these aggregated $297,561,800 in 1925, for the first nine months of 1926 the aggregate was only $191,000,000. Customer ownership continues to prove a boon to the industry. Action to make utility securities legal investments for savings banks continues and favorable legislation has resulted in several states.

POLITICAL HAPPENINGS AND TRENDS

A fundamental political movement that affects the light and power industry grew apace in 1926. This concerns regulation of utilities doing business in more than one state and those exchanging or transmitting energy across state borders. Leaders of the light and power industry, state executives, most federal executives and state commissioners favor handling this situation by having a joint or co-operative regulatory body constituted and formed by the several state commissions concerned. This method has been used in practice and is growing in favor. But there has been some advocacy of the appointment of a national regulatory body reporting to the federal government to handle interstate regulation. No governmental acceptance has yet been had for this plan, but its advocates continue to hold it forth for action.

Other political happenings have been quite local in their influence and have been favorable on the whole. In the West state development of water power has been voted down by the people. The Colorado River development continues to be a bone of contention among several states, the St. Lawrence remains a political game between Canada and the United States and the United States and New York State. Muscle Shoals still remains in the hands of Congress. In one or two states contributions of money to political campaign funds by utility executives has resulted in criticism. But the political horizon from a national viewpoint is clear and bright.

During 1926 the executives of the light and power industry outlined the possibilities of present markets and urged exploitation of these markets for more intensive electric service. The address of Samuel Insull at Atlantic City last June was typical of executive recognition of possibilities and showed the great opportunities for service that were being neglected. New services and intensified service to existing customers are advocated as an industry policy.

Number of Central-Station Operating Systems and Installed Generator Rating

State	Operating Companies (Nov. 1, 1926)*			Generator Rating Jan. 1, 1927 Kva.	United States Census Data (Jan. 1, 1923)			
					Operating Companies			Total Generator Rating, Kw.
	Total Number	Light and Power Companies	Municipal Systems		Total Number	Light and Power	Municipal	
United States	4,885	2,836	2,049	26,812,710	6,355	3,774	2,581	14,313,438
New England	342	271	71	2,310,600	365	290	75	1,456,574
Middle Atlantic	481	373	108	6,870,000	593	465	128	3,664,986
South Atlantic	604	322	282	2,722,140	765	371	394	1,356,478
East North Central	988	554	434	6,590,000	1,279	724	555	3,309,539
West North Central	1,210	504	706	1,621,070	1,722	802	920	1,171,496
East South Central	266	161	105	1,295,500	427	266	161	573,738
West South Central	509	308	201	1,077,200	625	419	206	461,984
Mountain	294	197	97	1,134,000	351	257	94	661,376
Pacific	191	146	45	3,192,200	228	180	48	1,657,267
New England								
Maine	65	59	6	242,200	82	75	7	89,983
New Hampshire	45	40	5	107,900	57	52	5	51,617
Vermont	61	49	12	115,700	57	42	15	96,866
Massachusetts	122	80	42	1,105,000	117	76	41	794,420
Rhode Island	9	9	0	244,200	8	7	1	163,900
Connecticut	40	34	6	495,600	44	38	6	259,788
Middle Atlantic								
New York	224	176	48	3,740,000	291	232	59	1,858,890
New Jersey	36	21	15	590,000	60	42	18	356,443
Pennsylvania	221	176	45	2,540,000	242	191	51	1,449,653
South Atlantic								
Delaware	13	3	10	49,140	†	†	†	†
Maryland	42	33	9	232,000	*54	*32	*22	*300,108
District of Columbia	3	3	0	143,000	†	†	†	†
Virginia	67	48	19	351,000	99	69	30	117,272
West Virginia	46	46	0	665,000	66	57	9	300,463
North Carolina	127	61	66	398,000	182	85	97	167,421
South Carolina	63	37	26	405,000	87	40	47	292,880
Georgia	158	53	105	275,000	176	43	133	107,213
Florida	85	38	47	204,000	101	45	56	71,121
East North Central								
Ohio	248	136	112	1,772,000	298	157	141	897,412
Indiana	170	89	81	652,000	212	119	93	335,450
Illinois	221	136	85	2,210,000	284	163	121	972,550
Michigan	159	86	73	1,280,000	232	125	107	691,080
Wisconsin	190	107	83	676,000	253	160	93	413,047
West North Central								
Minnesota	200	73	127	386,000	254	99	155	227,729
Iowa	176	76	100	461,070	294	148	146	236,036
Missouri	161	103	58	324,000	240	166	74	315,514
North Dakota	136	98	38	16,400	154	109	45	30,000
South Dakota	95	44	51	28,100	150	90	60	40,353
Nebraska	231	62	169	138,500	340	115	225	117,733
Kansas	211	48	163	267,000	290	75	215	204,131
East South Central								
Kentucky	79	63	16	217,000	138	111	27	103,361
Tennessee	69	46	23	398,000	110	69	41	166,761
Alabama	65	33	32	641,000	72	39	33	261,431
Mississippi	53	19	34	39,500	107	47	60	42,185
West South Central								
Arkansas	70	49	21	80,500	87	63	24	42,239
Louisiana	76	31	45	173,700	81	37	44	32,838
Oklahoma	155	67	88	198,000	167	67	100	121,100
Texas	208	161	47	625,000	290	252	38	265,807
Mountain								
Montana	38	34	4	446,000	64	57	7	227,253
Idaho	48	29	19	264,000	42	28	14	135,088
Wyoming	33	20	13	18,600	41	31	10	30,015
Colorado	72	42	30	181,000	79	51	28	112,590
New Mexico	24	23	1	8,000	31	26	5	15,178
Arizona	29	23	6	57,500	35	30	5	48,870
Utah	25	13	22	145,600	47	23	24	81,347
Nevada	15	13	2	13,300	12	11	1	11,035
Pacific								
Washington	68	56	12	619,200	80	66	14	362,576
Oregon	44	35	9	269,000	61	48	13	81,163
California	79	55	24	2,304,000	87	66	21	1,213,528

* Includes Delaware and District of Columbia. † Included under Maryland.

Results have been excellent, especially in the development of the home market. In many localities the electric refrigerator, the electric range, the electric water heater, the electric ironer and other appliances have been sold actively with gratifying results. The commercial goal for the homes is to raise consumption per customer from 365 kw.-hr. per year to at least 1,000 kw.-hr. per year. Experiences on local

Table I—Distribution of Central-Station Energy, 1913 to 1926

(100 per cent of the industry)

Year	Total Energy Generated, Kw.-Hr.†	Estimated Net Consumption by Customers (Kw.-Hr.)				Line Losses and Intra-Company Business, Kw.-Hr.
		Total	Lighting	Power	Railways	
1913	13,000,000,000	10,500,000,000	2,800,000,000	4,400,000,000	3,300,000,000	2,500,000,000
1914	14,400,000,000	11,620,000,000	2,900,000,000	5,370,000,000	3,350,000,000	2,780,000,000
1915	16,175,000,000	13,055,000,000	3,000,000,000	6,055,000,000	4,000,000,000	3,120,000,000
1916	21,230,000,000	17,130,000,000	3,580,000,000	9,450,000,000	4,100,000,000	4,100,000,000
1917	25,438,000,000	20,528,000,000	4,250,000,000	11,878,000,000	4,400,000,000	4,910,000,000
1918	29,200,000,000	23,570,000,000	5,200,000,000	13,870,000,000	4,500,000,000	5,630,000,000
1919	34,900,000,000	28,160,000,000	6,250,000,000	17,310,000,000	4,600,000,000	6,740,000,000
1920	39,518,903,000	31,898,903,000	7,580,000,000	19,498,903,000	4,820,000,000	7,620,000,000
1921	36,970,697,000	29,830,697,000	8,500,000,000	16,730,697,000	4,600,000,000	7,140,000,000
1922	43,559,677,000	35,159,677,000	9,298,000,000	20,219,677,000	5,642,000,000	8,400,000,000
1923	51,132,883,000	41,490,535,000	11,200,000,000	24,290,535,000	6,000,000,000	9,642,348,000
1924	54,413,403,000	43,893,403,000	12,600,000,000	25,092,873,000	6,200,530,000	10,520,000,000
1925	61,158,857,000	49,354,857,000	13,476,000,000	29,577,857,000	6,301,000,000	11,804,000,000
1926*	68,732,000,000	55,468,000,000	14,562,000,000	34,307,000,000	6,599,000,000	13,264,000,000

* Based on ten months' operation. † 1923–1926 as collected by U. S. Geological Survey.

properties show this can be done and in many cases even exceeded.

In electric heating for ovens and furnaces, in welding, in motorization, in lighting, in rural service, in radio and in many other directions market studies show that great commercial opportunities exist. During the year the industry has been strengthening its commercial staff and in 1927 there is no doubt that better selling will secure good returns. Along with a selling program there has been a renewed study of utility class businesses and of rates so that commercial efforts can be directed more intelligently and customers can be induced to use more service.

The art of power generation from fuel-burning stations has continued to improve. During 1926 several large systems operated during the year on a thermal economy of 20,000 B.t.u. per kilowatt-hour and less. About six years ago the corresponding figure would have been 30,000 or more.

Higher pressures and temperatures, more efficient equipment, more complete recirculation of heat and improved use of fuels give the answers to the economies obtained. The end is not yet in sight and 1927 will witness fuel-burning stations of upward of 1,000,000 kva. capacity in operation at around 16,000 B.t.u. per kilowatt-hour or less. Even now some slightly smaller stations have reached a lower limit of about 13,500 B.t.u. per kilowatt-hour over long periods. The erection of these highly efficient stations and their operation at the best attainable load factor has in seven years reduced the average fuel consumption throughout the country from 3.1 lb. of coal per kilowatt-hour to 1.91 lb.

These marked economies in power production in fuel-burning stations have influenced industry developments considerably. Cheaply developed water powers near loads are not available and the fuel economies have decreased the economic radius of power transmission from distant water powers very greatly. In several instances this fact, among others, is causing hydro-electric utilities to build large and modern fuel-burning stations. In other instances economic investigations of water-power site developments have resulted in decisions that their development would not be profitable as com-

Table II—Sources of Central-Station Gross Income, 1921 to 1926

(100 per cent of the industry)

Year	Total Gross Income	Received from Lighting Customers	Received from Power Customers	Received from Electric Railways	Received from Other Public Utilities
1921	$944,400,000	$570,500,000	$267,800,000	$44,650,000	$61,450,000
1922	1,072,119,883	657,119,883	303,200,000	50,750,000	61,050,000
1923	1,269,550,000	795,000,000	358,150,000	52,200,000	64,200,000
1924	1,354,570,000	902,670,000	321,000,000	54,400,000	76,500,000
1925	1,506,600,000	991,000,000	378,400,000	53,600,000	83,600,000
1926*	1,684,000,000	1,072,000,000	443,000,000	56,000,000	113,000,000

* Based on ten months' operations.

Table III—Activities of the Central-Station Industry by Sections, 1921 to 1926

(100 per cent of the industry)

Section	1921	1922	1923	1924	1925	1926†
	Energy Generated, Kilowatt-Hours*					
United States	36,970,697,000	43,559,677,000	51,132,883,000	54,413,403,000	61,158,857,000	68,732,000,000
New England	2,685,665,000	3,160,550,000	3,664,602,000	3,748,536,000	4,236,675,000	4,592,000,000
Atlantic	12,981,516,000	15,709,032,000	18,695,901,000	19,694,478,000	21,880,778,000	24,715,000,000
North Central	11,501,270,000	13,436,664,000	15,614,068,000	16,644,922,000	18,913,784,000	21,305,000,000
South Central	2,452,786,000	2,826,224,000	3,380,984,000	3,791,011,000	4,607,650,000	5,410,000,000
Mountain-Pacific	7,349,460,000	8,427,207,000	9,777,328,000	10,534,456,000	11,519,970,000	12,710,000,000
	Gross Revenue from Sale of Energy					
United States	$944,400,000	$1,072,119,883	$1,269,550,000	$1,354,570,000	$1,506,600,000	$1,684,000,000
New England	89,050,000	103,885,016	120,200,900	126,650,000	141,100,000	152,000,000
Atlantic	342,970,000	387,811,179	476,500,000	507,155,000	563,000,000	632,000,000
North Central	314,600,000	358,079,391	418,350,000	445,150,000	475,000,000	531,000,000
South Central	77,020,000	76,134,431	103,000,000	105,610,000	133,700,000	155,000,000
Mountain-Pacific	120,760,000	146,209,866	151,500,000	170,000,000	193,800,000	214,000,000
	Operating and Maintenance Expenses‡					
United States	$432,400,000	$481,570,000	$576,880,000	$617,980,000	$661,200,000	$735,000,000
New England	40,150,000	50,000,000	57,600,000	58,286,000	62,900,000	65,000,000
Atlantic	151,925,000	175,800,000	219,000,000	221,320,000	256,200,000	271,000,000
North Central	160,925,000	171,300,000	202,000,000	214,094,000	224,100,000	251,000,000
South Central	38,000,000	34,200,000	46,100,000	50,750,000	53,800,000	73,000,000
Mountain-Pacific	41,400,000	50,270,000	52,180,000	73,530,000	64,200,000	75,000,000

* Data collected by U. S. Geological Survey. † Based on ten months' operations. ‡ Do not include interest, taxes, depreciation or sinking fund.

Table IV—Operations of Central-Station Hydro and Fuel Power Plants, 1924 to 1926*

(100 per cent of the industry)

Section	Energy Generated During 1924				Energy Generated During 1925				Energy Generated During 1926†			
	Hydro Plants		Fuel Power Plants		Hydro Plants		Fuel Power Plants		Hydro Plants		Fuel Power Plants	
	Thousands of Kw.-Hr.	Per Cent of Total	Thousands of Kw.-Hr.	Per Cent of Total	Thousands of Kw.-Hr.	Per Cent of Total	Thousands of Kw.-Hr.	Per Cent of Total	Thousands of Kw.-Hr.	Per Cent of Total	Thousands of Kw.-Hr.	Per Cent of Total
United States	19,646,801	36.1	34,766,602	63.9	21,996,547	35.9	39,162,310	64.1	25,132,000	36.7	43,600,000	63.3
New England	1,394,860	37.2	2,353,676	62.8	1,587,141	37.6	2,649,534	62.4	1,674,000	36.5	2,918,000	63.5
Middle Atlantic	4,518,290	32.5	9,381,381	67.5	5,026,384	31.9	10,734,846	68.1	5,651,000	31.9	12,081,000	68.1
South Atlantic	2,288,369	39.4	3,506,438	60.6	1,667,075	27.2	4,452,473	72.8	1,925,000	27.6	5,058,000	72.4
East North Central	1,694,864	13.0	11,396,240	87.0	1,565,230	10.5	13,465,147	89.5	1,871,000	10.9	15,237,000	89.1
West North Central	1,200,158	33.8	2,353,660	66.2	1,276,649	32.9	2,606,758	67.1	1,400,000	33.3	2,797,000	66.7
East South Central	1,032,503	51.6	968,878	48.4	1,024,437	40.1	1,517,398	59.9	1,819,000	60.9	1,168,000	39.1
West South Central	10,430	0.6	1,779,200	99.4	30,491	1.4	2,035,324	98.6	51,000	2.8	2,372,000	97.2
Mountain	2,468,235	86.5	381,201	13.5	2,548,844	84.6	460,564	15.4	2,752,000	85.8	522,000	14.2
Pacific	5,039,092	65.6	2,645,928	34.4	7,270,296	85.4	1,240,266	14.6	7,989,000	84.6	1,447,000	15.4

* Data collected by U. S. Geological Survey. † Based on ten months' operations.

pared with building a fuel-burning station near the loads.

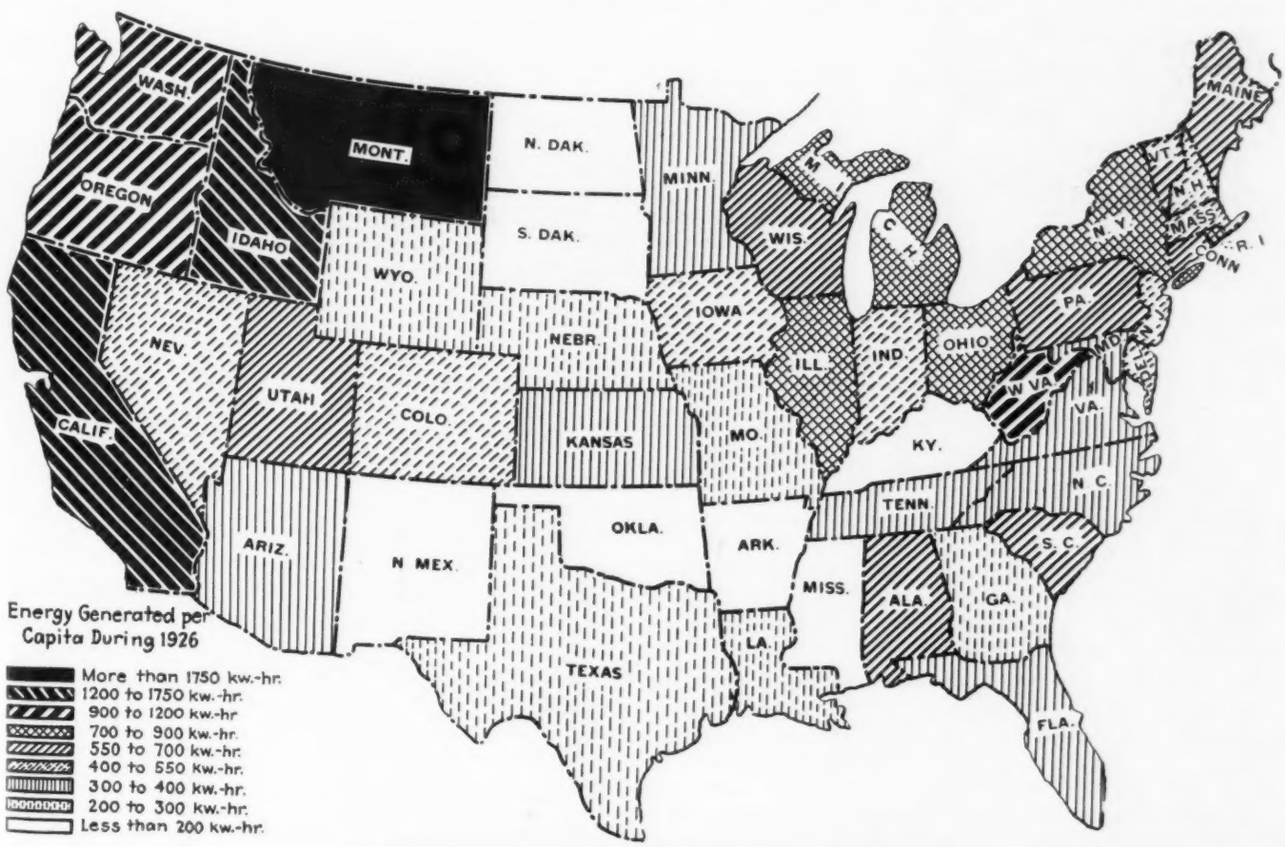
During 1927 many comparatively small stations will be started or built in the Southwest and Middle Western states. The selection of the most economical pressure and temperature for steam and the selection of design layouts in the light of recent large station experiences are important problems for solution in connection with these stations. How much of what has been learned from the highly economical base load large stations can be applied to secure the best stations for these installations?

Transmission Networks Formed

In transmission developments the 220,000-volt Wallenpaupack line stands out as the first one in the East to be built at this voltage. In the South very many miles of transmission line were built in 1926 to extend service into adjacent regions. In the West new lines and interconnecting lines were built and many large-capacity interconnection ties were built in the Middle West and East. Metallic circuits exist now between Boston and Chicago, and to Raleigh, N. C. A transmission network covers almost the entire area east of the Mississippi and another network covers the Pacific Coast.

No very new or radical developments in the transmission art occurred. The chief problem continues to deal with the cost of giving continuous service, the reduction of losses and the introduction of better apparatus for transmission construction and protection. An attempt is under way also to secure some greater degree of voltage standardization from generators to utilization apparatus and to make the large systems more stable in operation.

Rebuilt distribution systems to satisfy heavy load



Per Capita Electrical Energy Generation in Each State

Table V—Consumption of Fuel by Central-Station Steam Power Plants 1924 to 1926*

(100 per cent of the industry)

Section	Coal (Short Tons)			Fuel Oil (Barrels)			Gas (Thousands of Cubic Feet)		
	1924	1925	1926†	1924	1925	1926†	1924	1925	1926†
United States	32,556,970	35,321,502	36,889,000	16,096,675	9,742,238	9,249,000	46,993,070	45,479,189	49,053,000
New England	1,884,273	2,195,537	2,277,000	1,602,506	916,527	845,000	0	0	0
Middle Atlantic	9,253,926	9,766,271	10,422,000	225,881	223,287	260,000	370,589	226,749	150,000
South Atlantic	3,199,255	13,499,767	4,083,000	1,254,031	55,171	2,235,000	1,118,399	6,539,399	307,000
East North Central	12,831,055	3,116,778	14,333,000	43,487	1,113,513	57,000	2,851,487	5,267,705	4,872,000
West North Central	3,052,271	3,860,880	3,041,000	1,498,662	1,683,005	973,000	3,663,729	576,673	5,709,000
East South Central	1,232,379	1,641,802	1,320,000	221,183	148,255	117,000	93,752	26,400	31,000
West South Central	458,889	555,814	767,000	4,082,844	3,019,883	2,256,000	16,299,211	22,345,820	26,693,000
Mountain	588,746	623,229	602,000	250,944	210,271	242,000	194,673	146,395	144,000
Pacific	56,176	62,424	44,000	6,917,137	2,372,326	2,264,000	22,401,230	10,350,048	11,147,000

* Data collected by U. S. Geological Survey. † Based on ten months' operations.

density areas are taking the form of networks of alternating-current mains. Also there is a trend toward the use of higher distribution voltages for the primary supplies. In small towns distribution systems are being rebuilt for three-phase four-wire layouts.

Study is being given to system plans and a suggestion for synchronizing only at the load networks is receiving considerable attention. Distribution is a very expensive part of a utility plant and deserves the consideration it is now receiving. The time has passed for hit or miss installation if the loads of today are to be served.

Cable research continues to be very active and higher voltage cables are now commercially available. In New York and in Chicago 132,000-volt cable will be put in operation this year.

Ownership and Management Changes

In this issue is given an article on mergers and changes in ownership which graphically portrays the physical changes in property control that have occurred. In older electrified areas large consolidations have occurred. In regions between the Mississippi River and the Rocky Mountains a very active integration of properties occurred during the year and many changes of ownership resulted.

Large transmission systems continue to absorb small private and municipal plants entirely or to supply energy at wholesale rates to the communities served by them. The large systems have built several base load and economical transmission systems and have made many interconnections with adjacent properties. All this has resulted in marked economies in operating costs and there remains much to be done along the same lines before the total possibilities are exhausted.

Decrease in Number of Companies

There is a significant parallel between the present trend in the light and power industry and the movement half a century ago in the field of transportation. The early railway lines were short, isolated pieces, built where and when the necessary conditions existed of prospective traffic, business enterprise and financial courage. In time, in the more populous districts, the several little stretches began to link with one another, but they were continued as individual units, operating independently, each using its local time, which generally differed from its neighbor's. Many years elapsed before the vision of unified operation, standard time and through trains was transformed into reality by consolidation, by long-time leases and by new construction to close the remaining gaps which were the logical and necessary steps effectively to meet the growing transportation requirements of the country. The financial structure of the systems thus brought into existence reflects that history. The adoption of standard

Table VI—Electrical Energy Generated in Public Utility Plants

Includes energy generated by central stations, electric railways and certain other plants that contribute to the public supply.

State and Section	Electrical Energy Generated (Thousands of Kilowatt-Hours)			
	1923*	1924*	1925*	1926†
United States	55,674,435	59,013,590	65,870,306	73,385,000
New England	4,275,836	4,334,553	4,823,655	5,177,000
Middle Atlantic	15,413,092	16,305,735	18,298,853	20,279,000
East North Central	12,768,916	13,791,109	15,714,972	17,721,000
West North Central	3,975,852	3,934,166	4,253,656	4,562,000
South Atlantic	5,708,223	5,949,906	6,271,770	7,142,000
East South Central	1,890,000	2,063,570	2,609,746	3,059,000
West South Central	1,693,367	1,923 075	2,201,833	2,553,000
Mountain	2,838,915	2,963,081	3,127,142	3,399,000
Pacific	7,110,234	7,748,395	8,568,679	9,493,000
New England				
Maine	452,892	473,671	509,231	545,000
New Hampshire	195,705	215,806	263,683	242,000
Vermont	155,344	223,793	257,974	259,000
Massachusetts	2,093,161	2,097,998	2,377,649	2,475,000
Rhode Island	517,230	427,493	408,208	547,000
Connecticut	861,504	895,792	1,006,910	1,109,000
Middle Atlantic				
New York	8,722,289	9,288,569	10,266,700	11,078,000
New Jersey	1,250,606	1,304,297	1,506,155	1,740,000
Pennsylvania	5,440,197	5,712,869	6,525,998	7,461,000
East North Central				
Ohio	3,587,841	3,701,562	4,387,499	4,775,000
Indiana	1,261,097	1,297,676	1,484,472	1,755,000
Illinois	4,070,967	4,665,472	5,269,477	5,924,000
Michigan	2,580,399	2,696,648	3,031,273	3,445,000
Wisconsin	1,268,612	1,429,751	1,542,251	1,822,000
West North Central				
Minnesota	857,931	869,866	1,045,684	1,088,000
Iowa	1,109,719	1,175,068	1,195,315	1,304,000
Missouri	1,060,976	888,755	865,802	908,000
North Dakota	36,116	39,296	39,050	46,000
South Dakota	62,053	65,909	74,875	79,000
Nebraska	316,684	337,902	366,266	390,000
Kansas	532,373	557,370	666,664	747,000
South Atlantic				
Delaware	90,267	87,977	102,100	128,000
Maryland	510,553	482,346	572,651	607,000
Dist. of Columbia	301,298	315,227	349,803	376,000
Virginia	729,641	743,668	801,568	924,000
West Virginia	1,710,883	1,762,737	1,642,894	1,751,000
North Carolina	632,317	647,330	942,294	1,040,000
South Carolina	894,893	943,577	881,536	1,061,000
Georgia	656,046	748,756	660,790	720,000
Florida	182,325	218,288	318,134	535,000
East South Central				
Kentucky	352,274	405,194	474,745	513,000
Tennessee	649,484	694,073	874,973	936,000
Alabama	823,216	890,087	1,169,101	1,517,000
Mississippi	65,026	74,216	90,927	93,000
West South Central				
Arkansas	147,675	154,682	189,070	190,000
Louisiana	282,580	308,262	350,322	410,000
Oklahoma	290,495	331,157	394,383	467,000
Texas	972,617	1,128,974	1,268,058	1,486,000
Mountain				
Montana	1,138,545	1,145,285	1,262,629	1,391,000
Idaho	694,871	792,532	754,079	812,000
Wyoming	48,853	53,556	55,544	58,000
Colorado	461,570	490,030	522,892	562,000
New Mexico	18,268	19,913	21,787	25,000
Arizona	157,183	153,196	130,541	154,000
Utah	272,577	266,946	339,967	356,000
Nevada	47,048	41,623	39,703	41,000
Pacific				
Washington	1,446,486	1,503,560	1,623,007	1,699,000
Oregon	594,434	678,395	729,859	815,000
California	5,069,314	5,566,440	6,215,813	6,979,000

* U. S. Geological Survey data. † Based on ten months' operations.

time, in 1883, wrote into law the acknowledged need of unity in operation.

Forty years ago central stations were yet in their infancy. The industry had no past. Its possibilities were visions of the future. Its hazards were unknown. With business experience and technical progress and with public appreciation of the benefits of the new service came physical expansion. Counterpart of through service on the railroad, the transmission line arrived to provide facilities for long-haul delivery of energy, a requirement of modern industry equally essential with the materials themselves.

Economy of production necessitated the unified operation of systems thus joined. System load dispatching, the interchange of energy, centralized management, consolidations, the absorption of small companies, large-scale financing but re-enact the story of the railroads.

The year 1926 finds the industry in the midst of this movement toward consolidation and co-ordination. The list of corporate changes is longer than ever before. To keep the records correct has been a task of unusual difficulty. It has called for revision after revision. In the four-year period since the census enumeration the total number of operating companies decreased from 6,355 to 4,827, a reduction of 24 per cent. Of these, municipal systems shrank from 2,581 to 2,031.

Energy Sales on Increase

A strong sidelight is cast on the trend toward unified operation by the increasing magnitude of intercompany energy sales.

Of the 74 per cent gain in the past three years shown in the table, the larger portion has come since the fall of 1925. From the rise that began in September of that year there has been no recession. The aggregate for the first nine months of 1926 was practically equal to the total for all of 1925.

Purchases for resale now amount to a fifth of the energy generated, and although this proportion may include, in a sense, some duplications in the case of energy relayed through an intermediate company, and although the flow over a given line may be in opposite directions at different times, the trend is significant. Interconnection has been an essential factor in making possible the great improvement in fuel efficiency that has been effected in recent years and that has attained a magnitude that makes it stand out as a real contribution of the central-station industry to our national wealth.

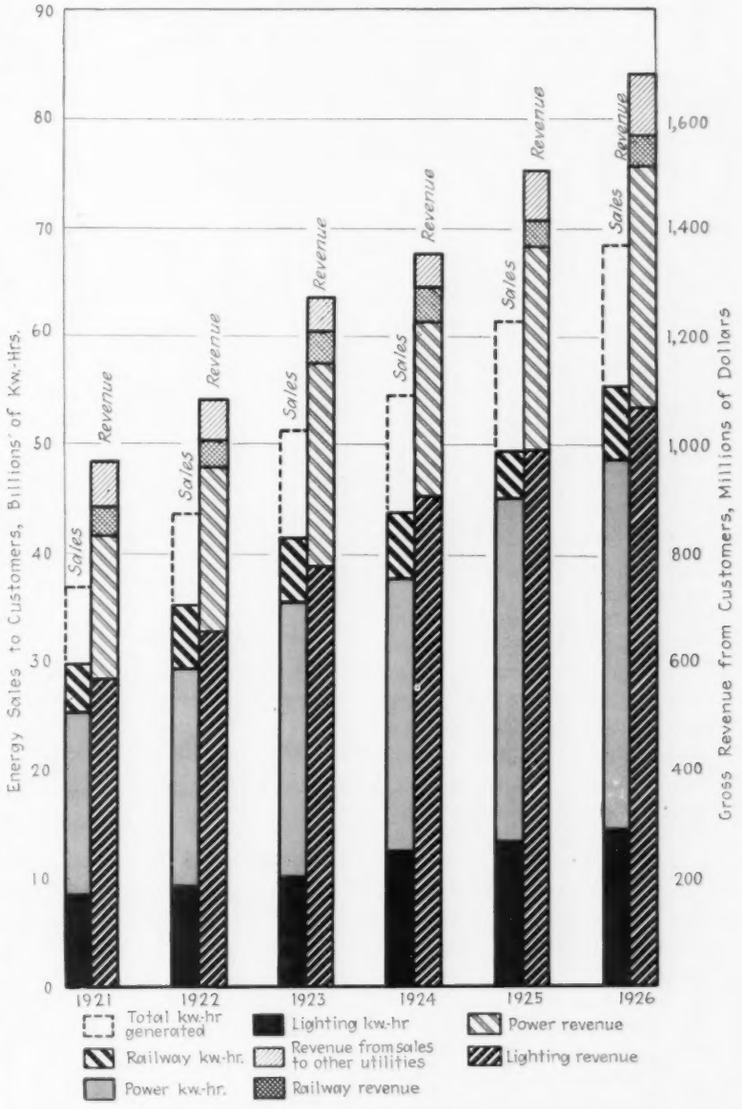
The integration of properties into large systems involves many executive and management problems. In finance, accounting, engineering sales and general administration, there have arisen necessities for making effective organization arrangements. It speaks well for executive leadership that relations have been harmonious and that great progress toward the ultimate set-up has been made. Ownership changes to large systems would seem to be quite stable, but if changes occur, they will involve transactions of great magnitude.

Consolidations and mergers seem destined to continue. The advantages already demonstrated in the way of fuel saving, in the continued decrease in operating expenses per unit of energy generated and the consequent lowering of the price to the consumer, as well as in more effective financing through large-scale planning, lead to no other conclusion. The construction and operation of highly efficient baseload stations strategically located, the development of water powers and their unified operation to take maximum advantage of the run-off in different water-sheds are possible of achievement only in properties that are welded together into a unified system.

Kilowatt-Hours Purchased for Resale

Year	Kilowatt-Hours Purchased	Increase Over Preceding Year, Per Cent
1923	7,409,800	...
1924	8,310,000	12.1
1925	9,704,000	16.7
1926	12,870,000*	32.6

*Partly estimated.



Energy Generated and Revenue for Different Classes of Utility Service

Statistics on the Operations of the Electric Light and Power Industry Based on Research Studies Made by "Electrical World" and Data Collected by the U. S. Geological Survey and U. S. Census Bureau

	1913	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
Total energy generated (thousands of kw.-hr.)	13,000,000	16,175,000	21,230,000	25,438,000	29,200,000	34,900,000	39,518,903	36,970,697	43,559,677	51,132,883	54,413,403	61,158,857	(a) 68,732,000	(b) 77,000,000
Energy sold to lighting customers (thousands of kw.-hr.)	2,800,000	3,000,000	3,580,000	4,250,000	5,200,000	6,250,000	7,580,000	8,500,000	9,298,000	11,200,000	12,600,000	13,476,000	(a) 14,562,000	(b) 16,400,000
Energy sold to power customers (thousands of kw.-hr.)	4,400,000	6,055,000	9,450,000	11,878,000	13,870,000	17,310,000	19,498,903	16,730,697	20,219,677	24,290,535	25,092,873	29,577,857	(a) 34,307,000	(b) 38,500,000
Energy sold to electric railways (thousands of kw.-hr.)	3,300,000	4,000,000	4,100,000	4,400,000	4,500,000	4,600,000	4,820,000	4,600,000	5,642,000	6,000,000	6,200,530	6,301,000	(a) 6,599,000	(b) 7,300,000
Energy lost in transmission (thousands of kw.-hr.)	2,500,000	3,120,000	4,100,000	4,910,000	5,630,000	6,740,000	7,620,000	7,140,000	8,400,000	9,642,348	10,520,000	11,804,000	(a) 13,264,000	(b) 14,800,000
Total gross revenue (thousands of dollars)	(c) 302,273	360,000	436,000	526,894	664,850	773,650	882,750	944,400	1,072,120	1,269,550	1,354,570	1,506,600	(a) 1,684,000	(b) 1,833,000
Revenue from lighting customers (thousands of dollars)	(d) 271,096	.....	.....	(e) 469,370	.....	.....	.....	570,500	657,120	795,000	902,670	991,000	(a) 1,072,000	(b) 1,160,000
Revenue from power customers (thousands of dollars)	.....	.....	.....	.....	.....	.....	.....	267,800	303,200	358,150	321,000	378,400	(a) 443,000	(b) 491,000
Revenue from electric railways (thousands of dollars)	.....	.....	.....	.....	.....	.....	.....	44,650	50,750	52,200	54,400	53,600	(a) 56,000	(b) 57,000
Revenue from other utilities (thousands of dollars)	(c) 31,177	.....	.....	57,524	.....	.....	.....	61,450	61,050	64,200	76,500	83,600	(a) 113,000	(b) 125,000
Average retail lighting rates (cents)	8.70	8.00	8.05	8.10	7.90	7.80	8.00	7.90	7.80	7.70	7.60	7.50	7.40	.....
Total sale of light and power securities (thousands of dollars)	.....	.....	.....	.....	.....	.....	369,374	538,917	719,961	922,722	1,236,438	1,279,785	(f) 1,390,000	(b) 1,500,000
Sales of securities by investment houses (thousands of dollars)	.....	.....	.....	.....	.....	.....	326,374	458,917	589,961	747,722	982,421	982,223	(h) 1,143,000	(b) 1,250,000
Sales direct to customers (thousands of dollars)	.....	.....	.....	.....	.....	.....	43,000	80,000	130,000	175,000	254,017	297,562	( ) 247,003	(b) 250,000
Aggregate capitalization, thousands of dollars (Jan. 1)	2,289,622	.....	.....	.....	3,245,185	3,600,000	4,100,000	4,400,000	4,800,000	5,200,000	5,800,000	6,600,000	7,500,000	8,400,000
Value of plant and equipment, thousands of dollars (Jan. 1)	2,175,678	.....	.....	.....	3,060,392	.....	3,711,924	4,212,588	4,301,752	4,465,016	5,080,000	5,762,000	6,483,000	7,325,000
Number of companies generating 100,000,000 kw.-hr	.....	.....	.....	.....	5	6	9	5	6	14	106	110	( ) 118	.....
Total operating expenses (thousands of dollars)	(c) 234,419	.....	.....	(g) 426,568	.....	.....	(f) 440,000	(f) 432,400	(f) 481,570	(f) 576,880	(f) 617,980	(f) 661,200	(f) 735,000	(b) 800,000
Total number of operating systems (Jan. 1)	5,221	.....	.....	.....	6,542	.....	.....	.....	.....	6,355	.....	.....	5,235	4,827
Total number of light and power companies (Jan. 1)	3,659	.....	.....	.....	4,224	.....	.....	.....	.....	3,774	.....	.....	3,143	2,796
Total number of municipal systems (Jan. 1)	2,581	.....	.....	.....	2,318	.....	.....	.....	.....	2,581	.....	.....	2,092	2,031
Total generator rating, kva. (Jan. 1)	6,400,000	6,970,000	7,550,000	8,520,000	11,239,000	12,330,000	13,730,000	15,860,000	16,660,000	17,960,000	19,900,000	22,000,193	24,343,793	26,812,710
Total number of generating plants (Jan. 1)	5,221	.....	.....	.....	6,542	.....	.....	.....	.....	5,444	.....	.....	.....	.....
Number of light and power company plants (Jan. 1)	3,659	.....	.....	.....	4,224	.....	.....	.....	.....	3,615	.....	.....	.....	.....
Number of municipal plants (Jan. 1)	1,562	.....	.....	.....	2,318	.....	.....	.....	.....	1,820	.....	.....	.....	.....
Companies generating all or part of their current (Jan. 1)	4,714	.....	.....	.....	5,124	.....	.....	.....	.....	4,380	.....	.....	.....	(b) 2,987
Companies purchasing all their current (Jan. 1)	507	.....	.....	.....	1,418	.....	.....	.....	.....	1,966	.....	(.) 1,886	.....	(b) 1,840
Total prime mover rating, horsepower (Jan. 1)	7,530,044	.....	.....	.....	12,936,755	.....	.....	.....	.....	20,296,235	.....	.....	.....	(b) 30,100,000
Rating of steam engines and turbines, horsepower (Jan. 1)	4,949,778	.....	.....	.....	8,449,076	.....	.....	.....	.....	14,171,222	.....	.....	.....	(b) 20,100,000
Rating of water wheels, horsepower (Jan. 1)	2,469,231	.....	.....	.....	4,277,273	.....	.....	.....	.....	5,822,018	.....	.....	.....	(b) 9,600,000
Rating of internal combustion engines, horsepower (Jan. 1)	111,035	.....	.....	.....	210,406	.....	.....	.....	.....	302,995	.....	.....	.....	(b) 400,000
Total expenditures for additions and extensions (thousands of dollars)	.....	.....	.....	.....	.....	.....	.....	222,318	324,016	602,143	692,440	721,300	841,344	958,000
Total number of customers (Jan. 1)	.....	5,158,000	5,841,000	6,513,000	7,200,000	8,505,000	9,899,000	10,820,000	11,700,000	12,334,720	14,384,727	16,566,604	18,068,221	19,528,581
Total number of domestic lighting customers (Jan. 1)	.....	4,170,000	4,720,000	5,260,000	5,825,000	6,900,000	8,010,000	8,700,000	9,430,000	9,925,210	11,623,644	13,406,777	14,700,510	15,923,060
Total number of commercial lighting customers (Jan. 1)	.....	810,000	920,000	1,030,000	1,130,000	1,320,000	1,550,000	1,740,000	1,850,000	1,954,450	2,258,347	2,588,983	2,735,661	2,920,501
Total number of industrial power customers (Jan. 1)	.....	178,000	201,000	223,000	245,000	285,000	339,000	380,000	420,000	455,060	502,736	570,844	632,050	685,020
Number of people living in electric-lighted dwellings (Jan. 1)	.....	18,100,000	20,450,000	22,800,000	25,250,000	29,950,000	34,700,000	37,700,000	40,800,000	43,100,000	50,300,000	58,200,000	63,100,000	68,500,000
Per cent of total population living in electric-lighted dwellings (Jan. 1)	.....	18.2	20.2	22.2	24.3	28.7	32.8	35.1	37.5	38.9	44.7	50.7	54.4	58.0
Total number of employees (Jan. 1)	79,335	.....	.....	.....	105,541	.....	.....	.....	.....	150,762	.....	.....	.....	(b) 203,000
Average salary of all employees (dollars)	(e) 771	.....	.....	902	.....	.....	.....	.....	1,409	.....	.....	.....	.....	.....
Average salary of officers (dollars)	(c) 1,760	.....	.....	2,211	.....	.....	.....	.....	3,287	.....	.....	.....	.....	.....
Average salary of superintendents and managers (dollars)	(c) 1,353	.....	.....	1,662	.....	.....	.....	.....	2,415	.....	.....	.....	.....	.....
Average salary of clerks (dollars)	(c) 731	.....	.....	825	.....	.....	.....	.....	1,344	.....	.....	.....	.....	.....
Average pay of wage earners (dollars)	(c) 692	.....	.....	833	.....	.....	.....	.....	1,312	.....	.....	.....	.....	.....
Total consumption of coal (short tons)	.....	.....	.....	21,565,273	.....	.....	.....	.....	26,130,865	28,712,580	32,556,970	35,321,502	(a) 36,889,000	(b) 38,000,000
Total consumption of oil (barrels)	.....	.....	.....	6,158,219	.....	.....	.....	.....	11,855,969	13,915,128	16,096,675	9,742,238	(a) 9,249,000	(b) 8,800,000
Total consumption of gas (thousands of cubic feet)	.....	.....	.....	14,199,204	.....	.....	.....	.....	20,174,385	29,287,251	46,993,070	45,479,189	(a) 49,053,000	(b) 50,500,000
Length of transmission lines, circuit miles (Jan. 1)	.....	.....	.....	.....	.....	.....	.....	.....	.....	86,290	94,880	102,270	112,800	(b) 122,900
Length of distribution lines, circuit miles (Jan. 1)	.....	.....	.....	.....	.....	.....	.....	.....	.....	354,780	383,780	416,670	449,600	(b) 481,100
Developed water power, horsepower (U. S. Geological Survey) (March 1)	.....	.....	.....	.....	.....	.....	.....	7,926,958	.....	.....	9,086,958	10,037,655	11,176,596	(b) 12,100,000

(a)—Estimated, based on ten months' operations.
(b)—Estimated, based on past growth.
(c)—1912, United States Census Bureau.
(d)—1912, includes all revenue except from other utilities.
(e)—Includes all income except from other utilities.
(f)—Does not include interest, taxes, depreciation or sinking fund.
(g)—United States Census Bureau.
(h)—Last week of December estimated.
(i)—November and December estimated.
(j)—July 1.

Budget $958,000,000 for 1927

Hydro-Electric Construction Will Be Active in 1927

Light and Power Companies to Increase Capital Expenditures 14 per Cent Over 1926—To Spend $397,000,000 for Generating Stations and $561,000,000 for Transmission and Distribution

REPORTS by wire from electric utilities indicate a total budget of $958,000,000 for 1927. This compares favorably with actual expenditures of $841,000,000 in 1926 and $721,000,000 in 1925. Of the money to be spent in 1927, $252,000,000 will be for fuel-burning generating stations, $145,000,000 for hydro-electric generating stations, $255,000,000 for transmission systems and $306,000,000 for distribution systems.

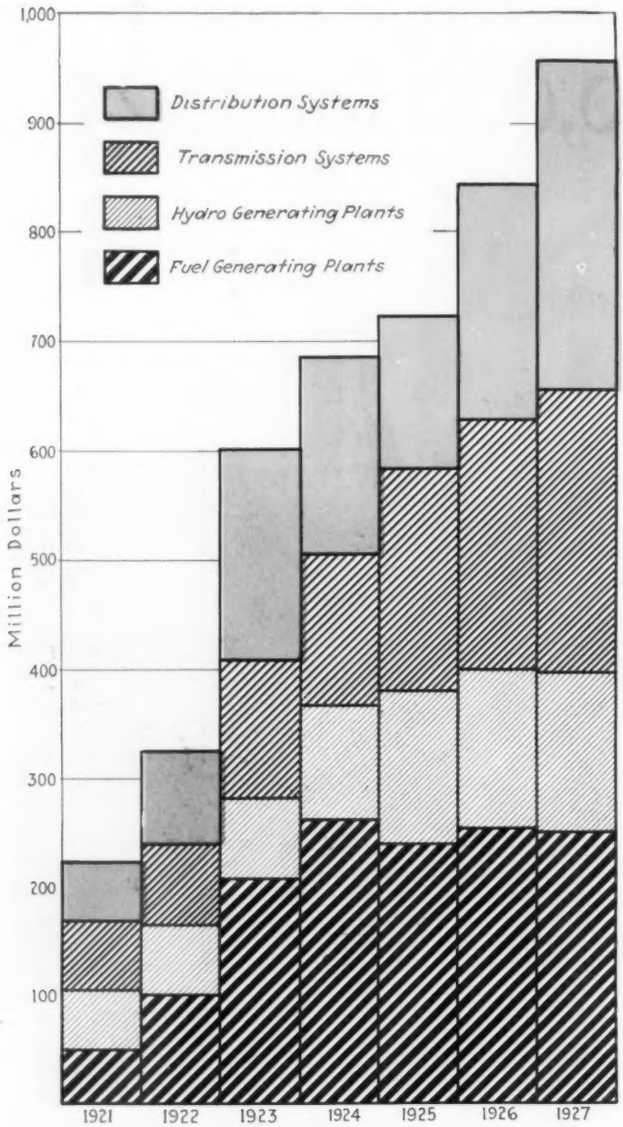
A budget of a billion dollars for an industry with a total capital investment in 1926 of $8,400,000,000 denotes a very favorable business situation. Good earnings, ample financial credit and a large increase in demands for service are necessary to sustain such a business program. It is interesting also to consider the demands on utility employees. They must not only operate the properties and satisfy existing services, but also build new facilities and sell a large increment of new business to customers. Next year, as in past years, the man-power of the industry will be exerted under peak-load conditions.

While a large sum is still spent on generation, a still larger sum is spent on transmission and distribution. For two years the utilities have been spending more for transmission and distribution additions than for generating plants, and this trend is on the increase. In 1927 the division is $397,000,000 for generation and $561,000,000 for transmission and distribution. This is a natural result of the very rapid expansion of service facilities in this country. Transmission lines have been built to link up communities and to form integrated systems. Small town and metropolitan distribution systems in nearly every section have been rebuilt, remodeled and strengthened in order

Table I—Total Value of All Additions and Extensions to Central-Station Generating, Transmission and Distribution Systems from 1921 to 1927

Section	1921	1922	1923	1924	1925	1926	1927*
Eastern States	$43,136,000	$101,525,000	$211,196,000	$259,850,000	$190,300,000	$200,107,000	$330,000,000
Southern States	29,341,000	49,805,000	82,105,000	104,460,000	130,500,000	190,500,000	200,000,000
North Central States	67,900,000	96,700,000	206,180,000	218,950,000	260,200,000	280,605,000	270,000,000
Western States	82,031,000	75,986,000	102,662,000	109,180,000	140,300,000	170,132,000	158,000,000
Totals	$222,408,000	$324,016,000	$602,143,000	$692,440,000	$721,300,000	$841,344,000	$958,000,000

* Budget estimates.



Where Budgets Have Been Spent and Expectations for 1927 Expenditures

to give more, better and more economical service. This trend will probably continue for some time and then decrease, for past experience indicates that as regards peak expenditures the industry has cyclic swings between generation and transmission and distribution.

But the national trend cannot be applied on a regional basis. Generation still requires the most money in the Eastern States and, depending upon the territory, transmission expenditures may be more or less than distribution expenditures. The ebb and flow of expenditures for each part of a utility property in the different sections are noted in Tables III and IV. The Conowingo development this year will cause a large increment to hydro-electric expenditures in the East for 1927. The great activity in the oil fields of the Southwest and the interconnection of properties here and in the South call for large expenditures in these regions during 1927. The Western States continue to spend generously for station developments, and it will be noticed that money to be spent for fuel-burning stations is largely increased for 1927. Such questions as standby service, lack of water power, reliability of service, a decrease in the economic distance of transmission and reduction in relative cost of fuel to hydro power are elements which have influenced the decision to build more fuel-burning stations. In common with other regions, the Western States are spending large sums on distribution, and general conditions in all parts of the country indicate that large sums of money will be needed to build distribution facilities to carry the loads that will come on the lines in the future.

Transmission activities have been steady in all sections, but differ in character. In the South and Middle West system-integration tie lines have been built. In the North Central region bulk-power-interconnection tie lines have been built, and in the East both diversity tie lines, bulk-power lines and interconnected-system lines have been built. In California new 220-kv. lines were built, and the Wallenpaupack project in the East was accompanied by the first 220-kv. line east of the Mississippi.

In the item of distribution expenditures miscellaneous moneys are included, such as those for stores, warehouses, office buildings and other properties incidental to system operations. This item approximates $50,000,000 and is chiefly for headquarters office buildings and stores. Several companies have built or purchased fine headquarters buildings during the year, and usually they place an attractive appliance store on the street level.

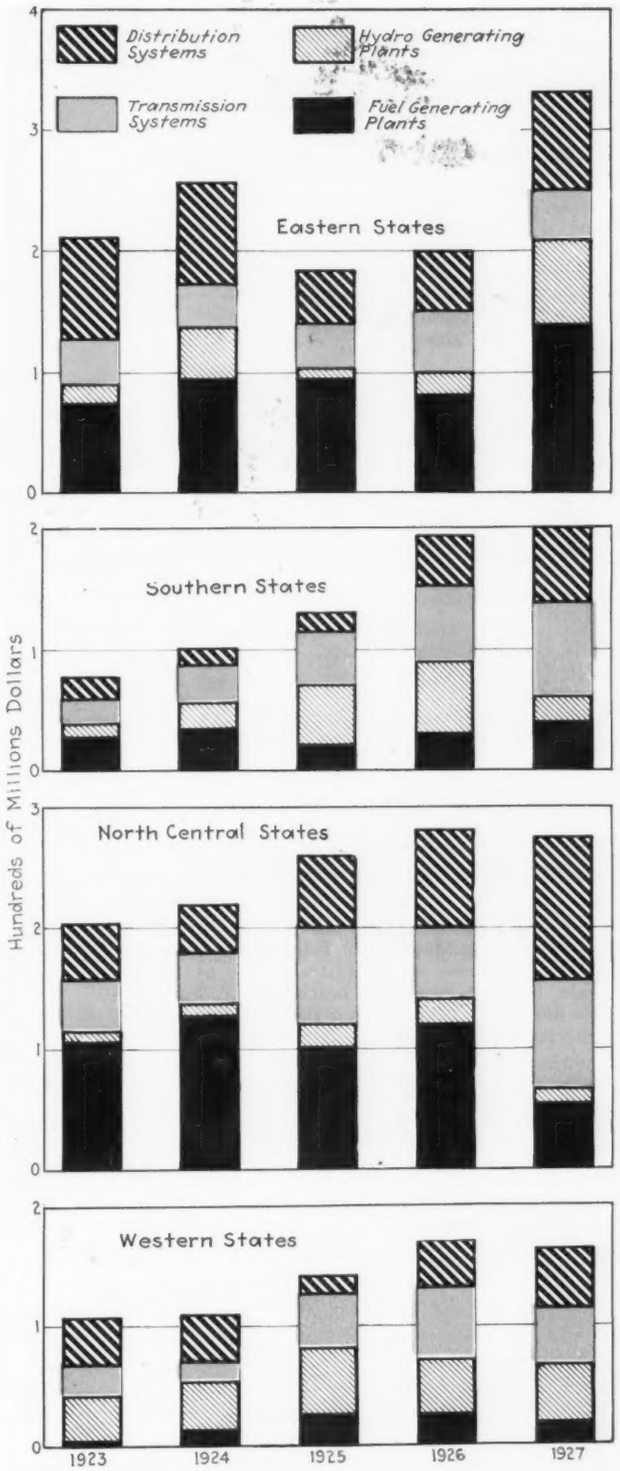
Table II—Segregation of Central-Station Construction Budget Between Generation and Transmission

Year	Total Central-Station Construction Budgets for Year	Total Expenditures for Electric Generating Plants	Total Expenditures for Transmission and Distribution Systems	Per Cent of Total Spent on Generating Plants	Per Cent of Total Spent on Transmission and Distribution Systems
1921....	$222,408,000	$102,674,000	$119,734,000	46.2	53.8
1922....	324,016,000	164,333,000	159,683,000	50.8	49.2
1923....	602,143,000	283,813,000	318,330,000	47.1	52.9
1924....	692,440,000	379,240,000	313,200,000	54.8	45.2
1925....	721,300,000	380,000,000	341,300,000	52.7	47.3
1926....	841,344,000	400,107,000	441,237,000	47.5	52.5
1927*...	958,000,000	397,000,000	561,000,000	41.5	58.5

* Budget estimates.

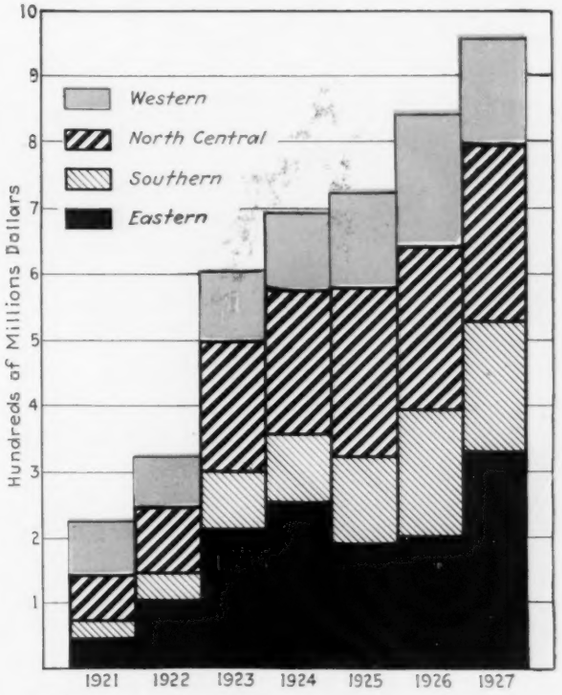
Table III—Value of Additions and Extensions to Generating Plants from 1923 to 1927

Section	Fuel-Electric Generating Plants					Hydro-Electric Generating Plants				
	Value of Additions					Value of Additions				
	1923	1924	1925	1926	1927	1923	1924	1925	1926	1927
Eastern States.....	$73,070,000	$94,900,000	$95,000,000	$80,107,000	$140,000,000	$15,926,000	$41,760,000	$15,000,000	$20,000,000	$70,000,000
Southern States.....	24,155,000	34,200,000	20,000,000	30,000,000	40,000,000	14,490,000	22,600,000	50,000,000	60,000,000	20,000,000
North Central States.	107,900,000	127,500,000	100,000,000	120,000,000	54,000,000	5,180,000	7,200,000	20,000,000	20,000,000	10,000,000
Western States.....	4,292,000	13,100,000	25,000,000	25,000,000	18,000,000	38,800,000	37,980,000	55,000,000	45,000,000	45,000,000
Totals for U. S....	$209,417,000	$269,700,000	$240,000,000	$255,107,000	$252,000,000	$74,396,000	$109,540,000	$140,000,000	$145,000,000	$145,000,000



Expenditures in Different Parts of System in Geographic Divisions

A questionnaire was sent out this year to all electrical properties, and the returns were very encouraging. For 1927 budgets telegrams were sent out and returns received in nearly all cases. According to these wired reports the properties sending replies will spend $745,000,000 in 1927. These properties repre-



Additions to Capital Investment in the Different Geographic Divisions

sent 18,000,000 kva. of the total of 26,000,000 kva. in generator rating. Based on a very conservative ratio of reported generator rating to total rating and of energy generation to total generation, there is no doubt that the figure of $958,000,000 for 1927 expenditures is conservative. From actual reports on questionnaires a total of $622,997,000 was spent by properties aggregating 18,000,000 kva. in 1926. Again using reported to total generator ratings and reported to total generated kilowatt-hours, ratios are obtained which give a conservative total expenditure of $841,344,000 in 1926. A check on this figure may be made by another analysis. The light and power utilities in 1926 raised $1,395,000,000 of new capital, of which $300,000,000 was for refunding and the remaining $1,000,000,000 for new corporate capital investments. In addition, there is the fact that many properties make capital investment additions out of earnings, so that the total expenditure for 1926 is conservative. Even more complete returns and checks give the total of $721,300,000 for new capital investments in 1925.

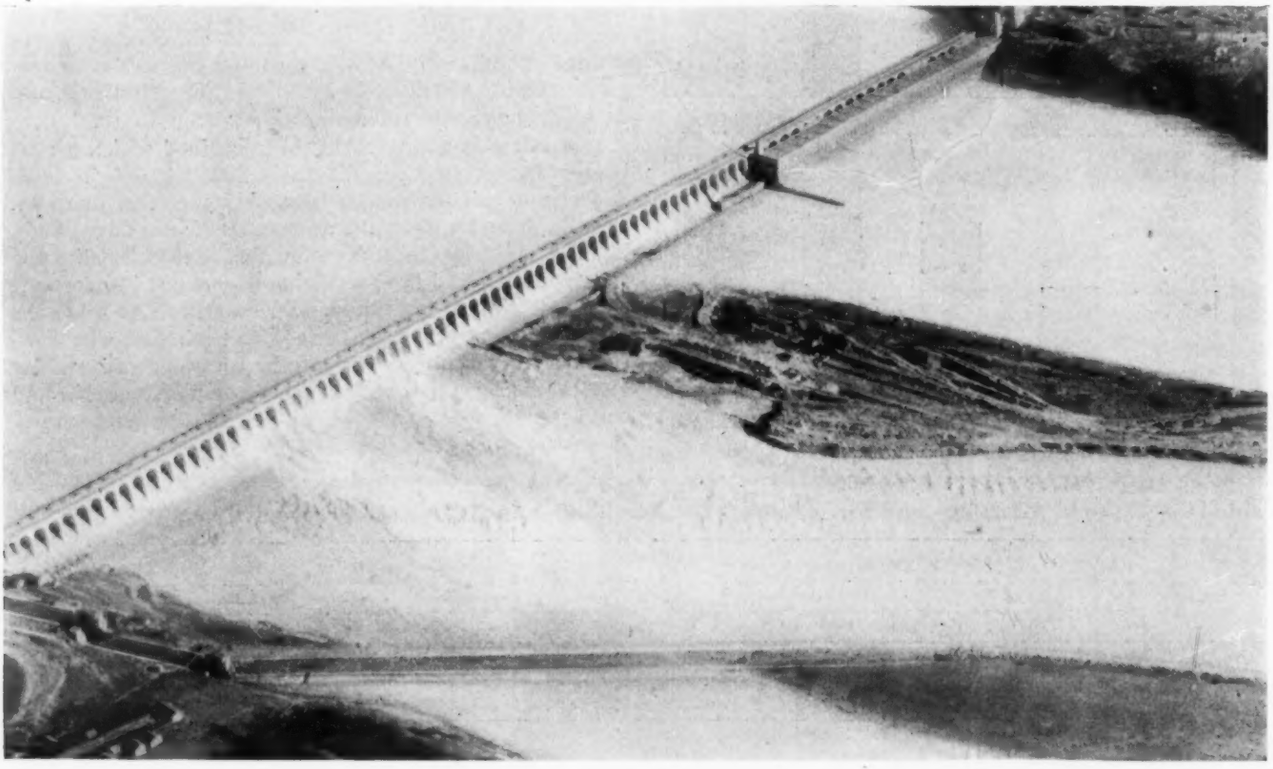
Table IV—Value of Additions and Extensions to Transmission and Distribution Systems from 1923 to 1927

Section	Transmission Systems — Value of Additions					Distribution Systems — Value of Additions				
	1923	1924	1925	1926	1927	1923	1924	1925	1926	1927
Eastern States.....	$37,880,000	$37,070,000	$ 35,000,000	$50,000,000	$40,000,000	$84,320,000	$86,120,000	$45,300,000	$50,000,000	$80,000,000
Southern States.....	21,890,000	33,400,000	45,200,000	60,456,000	80,000,000	21,570,000	14,260,000	15,300,000	40,044,000	60,000,000
North Central States.	44,800,000	43,930,000	80,200,000	60,605,000	90,000,000	48,300,000	40,320,000	60,000,000	80,000,000	116,000,000
Western States.....	20,630,000	19,790,000	45,300,000	60,000,000	45,000,000	38,940,000	38,310,000	15,000,000	40,132,000	50,000,000
Totals for U. S....	$125,200,000	$134,190,000	$205,700,000	$231,061,000	$255,000,000	$193,130,000	$179,010,000	$135,600,000	$210,176,000	$306,000,000

Outstanding Hydro Possibilities

The St. Lawrence and the Tennessee Rivers

DURING the year two topics of political and engineering interest were the development of the full hydro-power possibilities of the St. Lawrence (above) and Tennessee Rivers. No start was made in St. Lawrence development, but negotiations between Canada and the United States and between New York State and Ontario showed a large degree of international accord. On the Tennessee River Wilson Dam at Muscle Shoals (below) produced much power, but Congress has taken no action on the full development of the river or disposition of Muscle Shoals.



Electrical News of 1926

Building of Record-Breaking Equipment and Never-Ceasing Extension and Interconnection of High-Tension Transmission Lines Stand Out—Water Power, Mergers, Politics, Conventions, All Play Their Part

NEWS of the electrical industry is news of the day. It is not confined to the journals of that industry, but fills many a column in the daily press and many a page in non-related magazines. Not seldom it is blazoned on the coveted first page in all the splendor of "scare heads" or "special treatment." For the electrical industry now ranks among the very greatest and is as much part and parcel of every citizen's life as are the railroads, the mines and the crops.

Glancing back through the files of 1926, the most spectacular occurrences in the industry are naturally seen to have taken place in the sphere of the light and power operating companies, though the manufacturers who made the record-breaking equipment deserve a place of equal honor. Coal is still king in the northeastern part of the nation, and enormous steam-electric generators went into commission in the new East River station at New York, the Hudson Avenue station at Brooklyn, the Kearny station of the New Jersey Public Service company, the Trenton Channel station at Detroit, the Colfax station at Pittsburgh, the Avon station at Cleveland and the Huntley station at Buffalo, not to mention many less imposing but still important installations in other cities.

From Chicago came the news of the projected State Line station on the Illinois-Indiana border, which may eventually overtop all others in size. Rather unexpected was the announcement that Los Angeles is turning to steam as a supplementary source of power, the Southern California Edison Company having a large fuel-fired plant under way and the municipal authorities planning another one. On the other hand, the Philadelphia Electric Company has turned to water power temporarily, and the beginning of construction of the immense Conowingo Dam on the Susquehanna, with its accompaniment of hydro-electric equipment and of transmission projects, forms one of the biggest news items of the year.

Hydro-Electricity in the Limelight

Conowingo, if the chief, was, however, by no means the only hydro-electric news of importance. The noteworthy Cheat Haven plant on the Clarion River in Pennsylvania went into commission, the Martin Dam plant of the Alabama Power Company at Cherokee Bluffs was completed, and work was begun on the plant to be built at the Falls of the Ohio near Louisville. In California, while no plants of the first size came in, hydro-electric development, which never ceases in that state, was pushed vigorously, and in Washington State the Lake Chelan development for railroad electrification got under way. The promoters of the projected Passamaquoddy Bay tidal plant in Maine obtained a permit from the Federal Power Commission, as did applicants for rights in many other states, and altogether 1926 will rank as an eventful year in water-power annals in the United States. Canada reported the installation in 1925 of 719,000 hp. Equal activity was manifested there in 1926, and great new plants on the Catineau River have been planned for the International Paper Company.

Politics Plays Its Customary Part

Water power inevitably suggests politics. Name it, and Muscle Shoals, the Upper Tennessee, the St. Lawrence and the Colorado spring to mind. As predicted in these columns a year ago, the deadlock on legislative action affecting these streams has not been broken. Muscle Shoals has become a weariness to the public flesh and a congressional nightmare. The Tennessee, though reported on and applied for, awaits the lifting of the embargo, if it may so be termed, that the Federal Power Commission has applied both to it and to the Colorado. Governor Hunt of Arizona, re-elected, is as uncompromising as ever in his opposition to the seven-state treaty. Governor Smith of New York is equally determined about the potential water powers of that state. In a word, the mills of politics, like those of the gods, grind slowly. Time only will show whether in these instances they grind exceeding small.

Governor Pinchot of Pennsylvania failed to put through his "Giant Power" scheme; California (for the third time) and Oregon, both overwhelmingly, defeated the public ownership amendments put before the voters; the proposed tri-state agreement on the Delaware River between New York, New Jersey and Pennsylvania fell through; the Governors of Ohio and Pennsylvania kept up their fights over the personnel of the public service commissions in those states; a political scandal in Illinois implicated utility chiefs as heavy contributors to the primary funds of candidates for the United States Senate; accusations of political corruption, promptly denied, were made against company heads in Indiana, where dissatisfaction with the regulatory commission seems to have affected many citizens, and in Denver an agreement for a new franchise was reached between the city and the Public Service company and now awaits confirmation at the polls.

More significant in electrical history than political culs-de-sac and blind alleys is the ever-spreading area of high-tension interconnection. Transmission lines now cover the Northeastern, Southeastern and Middle Western States like a series of gigantic cobwebs with far-flung antennas; similar cobwebs, though at greater intervals, dot the trans-Mississippi prairies and the Mountain States, while a busbar the entire length of the Pacific Coast forms the western rim. The year 1926 saw the first 220-kv. line in the East put into service in Pennsylvania, saw interconnected stations stretching from Milwaukee to Boston operated in paral-

lel, saw Virginia, already connected at one end with Lake Erie, reaching down to join the interconnected Southern system, and that system at its other end well on its way to New Orleans; saw a line between St. Augustine and Miami, Fla., and thence westward to the Gulf Coast, rapidly reaching completion, undeterred by the hurricane, and saw two more triumphs for transmission on the Pacific Coast—the Great Western-San Joaquin line from Brighton to Merced and the Southern California Edison line from Pasadena to Bakersfield.

Interconnection was, indeed, the outstanding feature in light and power news. It made possible the taking over by central-station companies of scores of little private and municipal plants that the "high lines" had caused to become an economic absurdity.

In the large number of mergers perhaps the two transactions of most importance were the absorption of the Georgia Railway & Power Company by the Southeastern Power & Light and of the National Electric Power Company by the Insull interests.

Substantial rate cuts were announced in Philadelphia, Detroit, Baltimore, Brooklyn and other cities, and a customers' rebate of 50 per cent on October bills in Worcester made, it seems safe to say, a record in its own line. Regulation by the state commissions went on with comparatively little friction so far as the companies were concerned, but with considerable public and political agitation, arising from various causes, in some states. Court decisions everywhere followed the Supreme Court rulings that reproduction cost new must be a factor in valuation proceedings.

SOME OTHER OCCURRENCES

In the manufacturing branch of the industry the most notable event was the amalgamation of the Electric Power Club, the Associated Manufacturers of Electrical Supplies and the Electrical Manufacturers' Council into the National Electrical Manufacturers' Association, under the initial presidency of Gerard Swope and the management of Alfred E. Waller. The advent of the American Brown Boveri Electric Corporation and its successful bid on a record-breaking piece of heavy apparatus was another occurrence worthy of allusion in a summary of the year. The formulation of the League Council market development plan to promote business was of no little commercial interest to appliance manufacturers, jobbers, contractors, dealers and central stations alike.

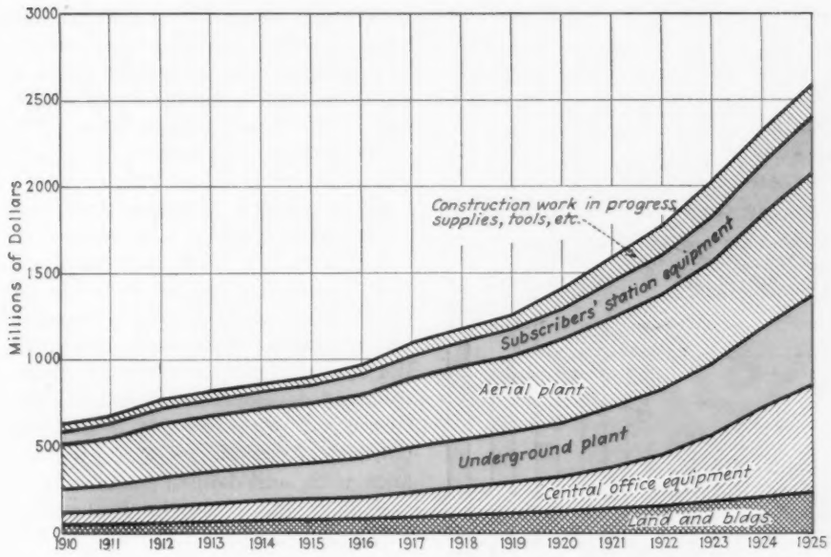
The engineering world was interested in the construction in California of the first 60 ft. (in height) of an experimental arch dam for testing purposes and its successful resistance to the pressure applied. The application of 1,200 lb. of high-pressure steam to a 7,000-kw. turbine in Milwaukee, the new high-tension laboratory at Stanford University and the successful culmination of the experiments to enlarge the scope of the cathode ray conducted by Dr. William D. Coolidge, to whom the Edison medal for 1926 was awarded, were a few of the other technical events of such an unusual nature that they broke into the "News."

The annual conventions of the American Institute of Electrical Engineers and the National Electric Light Association scored their customary success. Dr. Cummings C. Chesney of Pittsfield became president of the body first named and Robert F. Pack of Minneapolis was made head of the N.E.L.A. In this connection the regretted retirement of M. H. Aylesworth as managing director of the association and his succession by Paul S. Clapp should be mentioned.

Another notable convention—one of world-wide importance—was that of the International Electrotechnical Commission held in New York in the spring, with upward of a hundred delegates from fifteen European and other foreign countries, not including those from Canada. The visiting delegates were taken on a tour of the United States and the Dominion, and international co-operation and friendly relations were consolidated and enhanced. The United States later in the year was well represented at the regional convention of the World Power Conference held at Basle, Switzerland.

Against so much of good fortune for the industry must be set the inevitable losses by death. These included the dean of the electrical manufacturing industry, Charles A. Coffin; those veterans of central-station development in urban territory, Joseph B. McCall of Philadelphia and Charles R. Huntley of Buffalo; engineers and technicians like Carl Hering, Charles S. Cook and A. A. Dion; executives like Franklin S. Terry and William H. Thornley in the manufacturing world and James M. Graves and Robert W. Day in the light and power field, and directors and financiers like Randal Morgan, R. E. Breed and W. B. McKinley.

The Development of the Colorado Awaits the Political Agreement of the Western States Concerned



Bell System Physical Property in Millions of Dollars

Status of the Telephone Industry

Quality and Magnitude of Service Increased—Condensed Statistics of the Industry—Notable Economies Achieved—Increased Use of Communication Facilities

DURING the past year the use of the telephone has continued to expand and the quality of the service to improve. The following table shows approximately the number of telephones at the end of 1926, together with the same information for 1925:

Bell system:	Dec. 31, 1926	Dec. 31, 1925
Bell-owned telephones	12,810,000	12,035,000
Bell-connecting telephones	4,815,000	4,685,000
Total for Bell system	17,625,000	16,720,000
Telephones not connecting to Bell system	165,000	216,000
Total telephones	17,790,000	16,936,000

The number of telephones per hundred of population in the United States is more than fifteen. As compared with this, in the two largest industrialized countries of Europe there are less than three per hundred for Great Britain and about four per hundred for Germany.

It is a noteworthy fact that from practically any telephone station anywhere in the United States one can talk at any time of the day or night with any other telephone anywhere in the United States and to telephones in the more important centers in Canada and Cuba. On an average there are handled each day in the United States more than 70,000,000 exchange and toll connections, each one of which is an individual transaction.

Although late information covering all telephone companies in the United States is not at hand, figures showing expenditures for new plant for the Bell companies are as follows: During the year 1925, $365,000,000 was spent for new plant to keep the facilities at the highest standard and further to increase the system's facilities to care for the additional business. This includes expenditures for new plant to replace plant of a cost of $107,000,000 retired by reason of its having been worn out or destroyed by storms, or because of inadequacy, obsolescence or changes to meet public requirements. The net additions to telephone plant of the Bell system were approximately $258,000,000. For the year 1926 it is expected that the total expenditures for new plant will reach $394,000,000. The investment in Bell system plant and equipment devoted to furnishing telephone service as of the end of 1926 amounts to more than $2,800,000,000.

On Sept. 30, 1926, the number of persons employed by telephone companies (not including manufacturing companies) in the United States was about 375,000.

Progress in the introduction of new and improved apparatus, methods and instrumentalities is indicated by a few selected items as follows:

Research Has Enabled Constant Cable Improvement

As a result of continued development and research work, constant improvements have been made in the telephone cables so largely used in local exchange plants and now coming into wide use in the longer toll circuits. The past few years have seen greatly increased use of this improved cable. In the exchange cable, due to the extension of the use of smaller-gage wire, improved paper insulation and a more scientific determination of thicknesses necessary in the lead-antimony sheath, all of which have resulted in lower costs, the use of cable has become relatively more economical, and this is reflected in its growing use in the plant, as

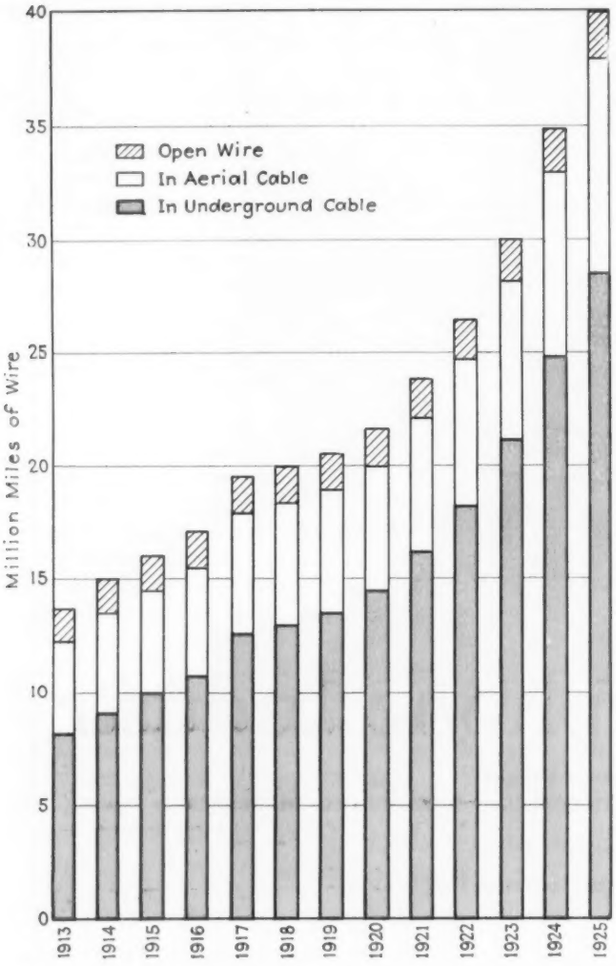


Fig. 2—Miles of Exchange Wire in the Bell System in the United States, Dec. 31

compared with other construction. Fig. 1 shows the decreasing cost per pair mile of cables in the Bell system, starting with the period when paper-insulated cable was first being employed. In this comparison variations in labor and material costs have been eliminated by using the same level of costs throughout.

INSULATION AND RELATIONS OF CABLE CONDUCTORS A PROBLEM

It should be understood that the matter of using 24-gage wire in cables is not by any means purely the mechanical operation of putting 2,400 wires in a certain sized sheath. In the first place, extensive studies are required to determine the right kind and volume of paper-insulating material and the best methods of applying it to the fine copper wire. Then the lay-up of the cable requires engineering design, taking into account manufacturing limitations as well as operating characteristics needed, to insure that each wire of the 2,400 is in the best relation to each other wire. These considerations are most important in limiting the cross-talk between pairs and insuring satisfactory values of capacitance and dielectric strength of the cable—factors all of which must meet standard requirements and limits. Further, to use such small-gage wires there is involved development of transmitters, receivers, induction coils, switchboard and associated apparatus to the point where communication can be carried on in accordance with well-defined standards of transmission.

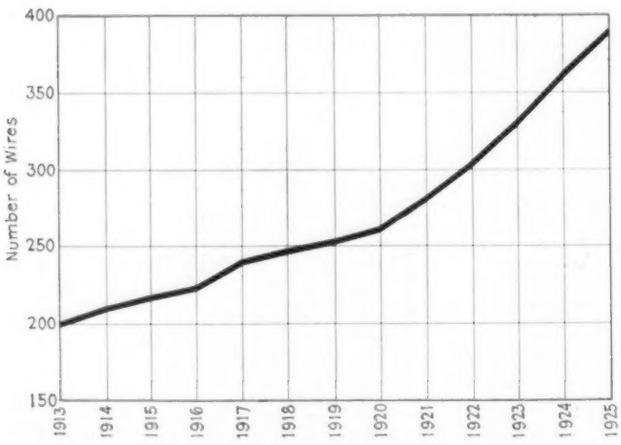


Fig. 3—Average Number of Underground Wires per Duct

Fig. 2 shows for the Bell system millions of miles of exchange wire by years. It will be noted that the use of cable, as compared with open wire, has been greatly extended in this type of plant. The number of pairs of wires in a full-sized underground cable has been increased from 50 in the year 1888 to 1,200 in recent types. This represents a greatly increased effectiveness in the use of underground duct space in addition to other marked advantages. Fig. 3 shows the increasing number of underground wires per duct during the period 1913 to 1925. If the curve were carried back over earlier years, the increase due to improved cable would be even more striking.

COMMON BATTERY COMPLICATES TRANSMISSION PROBLEMS

The transmission problem in a common battery exchange (practically all exchanges in large cities are now common battery) is a peculiarly complicated one. The line is required to carry direct current from the central office to energize the transmitter as well as to carry the alternating currents of speech frequencies, this source of alternating current being alternately at the two ends of the line. Any increase beyond a certain resistance, due to the use of small-gage cable, is thus doubly detrimental, in that it attenuates both the energizing direct current and the speech currents. Increase in capacitance due to too close crowding of the wires has, as compared with lower frequencies, a very marked attenuating effect on the transmitted voice currents, which range from 200 to 3,000 cycles in frequency. These limitations to the use of small-gage cable (22 and 24-gage) have been overcome, however, so that the standard of transmission is higher than it has ever been and, because of the increased efficiency brought about by the extended use of loading and repeaters, the subscriber is not limited in any way in talking over long distances.

The use of such small gages as 19 and 16 gage in cables for long-distance purposes, with the comparative immunity of lead-sheathed cable from storm damage, has been made possible not only by improvements in cable design but by the perfecting of repeaters, loading coils, echo suppressors, temperature regulators and other associated apparatus for long-distance cables. It is a striking fact that telephone circuits have become so long both geographically and electrically that echoes may be set up similar to echoes in the air. The electrical waves are reflected from the end of the circuit

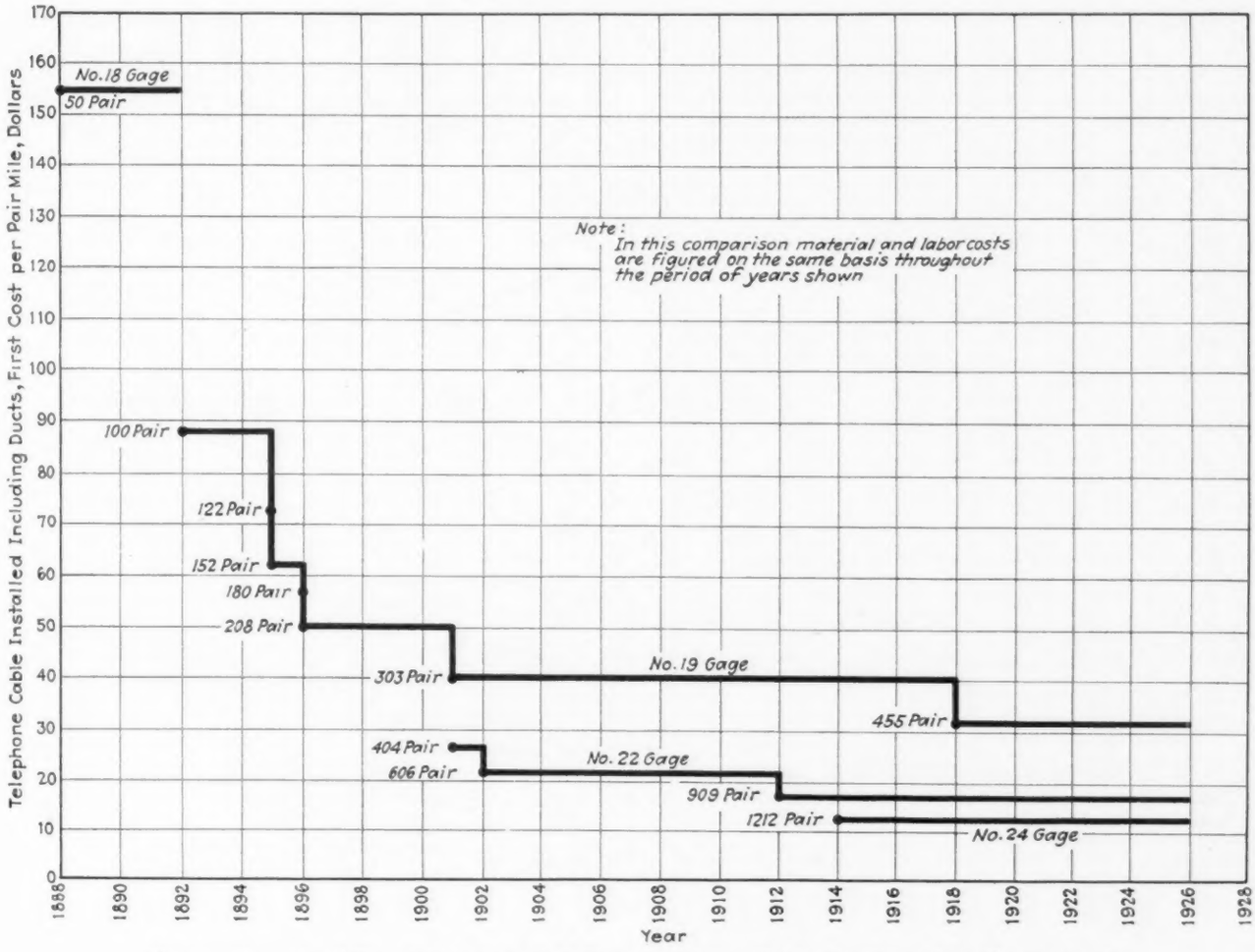


Fig. 1—Cost of a Mile of Circuit in Full Size Telephone Cable Has Been Steadily Reduced

Table II—Statistics of the Bell System

	Dec. 31, 1910	Dec. 31, 1915	Dec. 31, 1920	Dec. 31, 1924	Dec. 31, 1925	Increase During 1925
Number of telephones:						
Bell companies	3,933,056	5,968,110	8,333,979	11,242,318	12,035,224	792,906
Bell connecting companies and lines	1,949,663	3,204,385	4,267,956	4,664,232	4,685,000	20,768
Total telephones	5,882,719	9,172,495	12,601,935	15,906,550	16,720,224	813,674
Number of central offices	4,933	5,300	5,702	5,978	6,017	39
Number of connecting companies	7,396	8,735	9,231	9,252	9,227	*25
Number of connecting rural lines	10,449	19,579	26,032	28,059	28,861	802
Miles of pole lines	282,877	330,602	358,091	282,192	386,064	3.872
Miles of exchange wire:						
Wire in underground cable	5,630,851	9,947,359	14,384,135	24,760,252	28,425,392	3,665,140
Wire in aerial cable	2,800,000	4,503,124	5,586,531	8,135,034	9,462,213	1,327,179
Open wire	1,247,367	1,601,579	1,633,802	1,917,735	1,953,235	35,500
Total exchange wire	9,678,218	16,052,062	21,604,468	34,813,021	39,840,840	5,027,819
Miles of toll wire:						
Wire in underground cable	386,088	625,792	1,363,398	1,893,660	2,057,196	163,536
Wire in aerial cable	70,000	98,804	299,385	842,751	1,209,332	366,581
Open wire	1,507,906	1,728,887	2,110,153	2,344,187	2,366,172	21,985
Total toll wire	1,963,994	2,453,483	3,772,936	5,080,598	5,632,700	552,102
Total miles of wire	11,642,212	18,505,545	25,377,404	39,893,619	45,473,540	5,579,921
Average daily telephone conversations:†						
Exchange conversations	21,681,471	25,183,799	31,835,353	43,981,243	46,702,307	2,721,064
Toll conversations	602,539	819,030	1,327,247	1,835,209	2,098,163	262,954
Total conversations	22,284,010	26,002,829	33,162,600	45,816,452	48,800,470	2,984,018
Number of employees	120,311	156,294	231,316	279,659	293,095	13,436

There are throughout the United States 9,227 telephone companies and in addition 28,861 rural telephone lines operated mainly on a co-operative basis, which have arrangements with the associated Bell companies for the interchange of toll traffic. These are shown in the above table as "Connecting companies and connecting rural lines," and their telephones as "Bell-connecting" telephones. All other statistics are for the American Telephone & Telegraph Company and its 25 associated companies combined and do not include data for connecting companies or rural lines.

* Decrease. † For year ended Dec. 31.

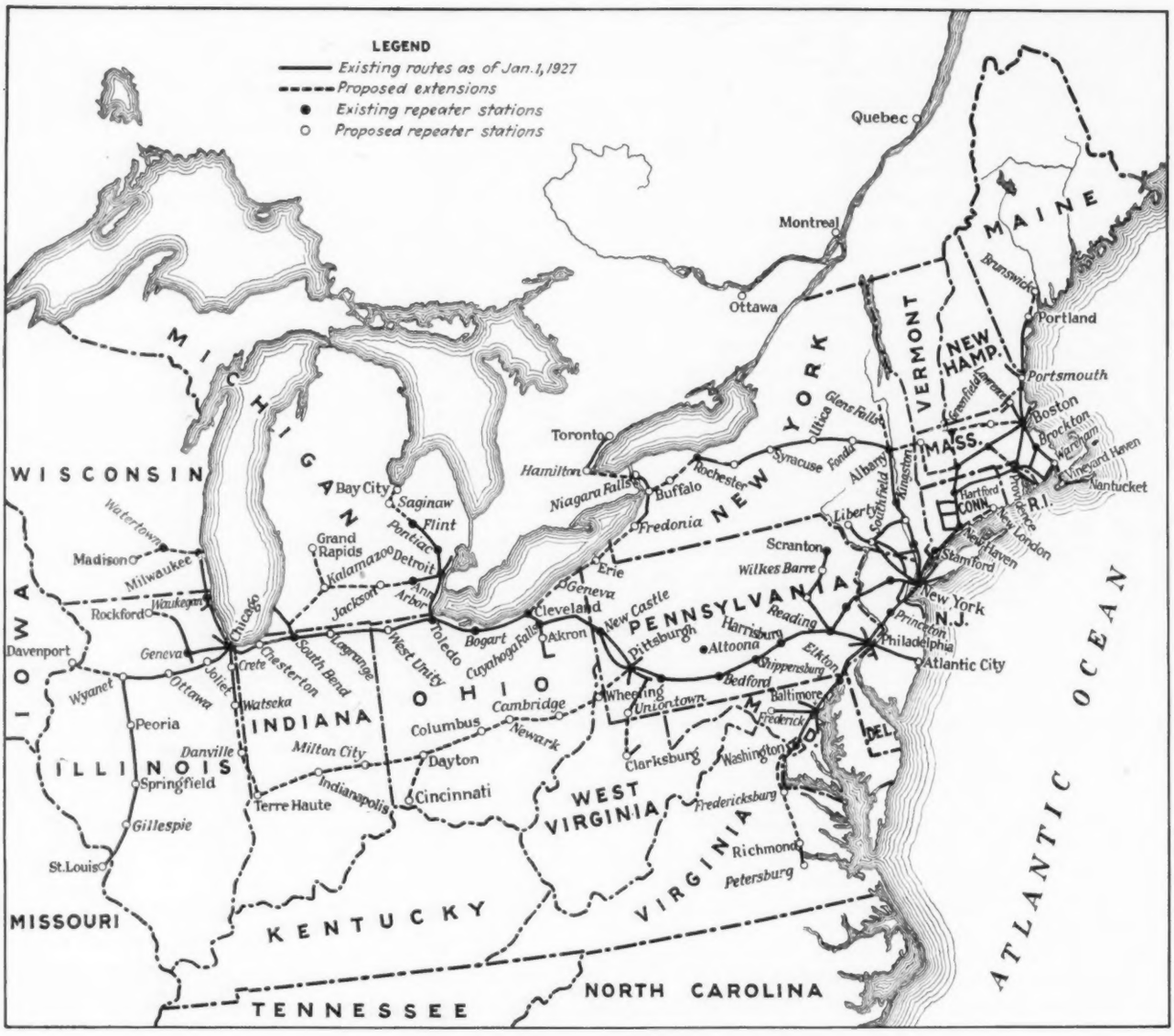


Fig. 4—Toll Cable System in the United States

and from electrical irregularities in the circuit, much as sound waves in the air are reflected from the side of a mountain or a building. This effect may become annoying when talking over electrically long circuits such as cable circuits, which are not equipped with echo suppressors.

An interesting example of toll cable use is the New York-Chicago cable. This cable is 861 miles long, of which 717 miles is aërial and 144 miles underground. The average number of telephone circuits (16 and 19-gage) is 250, and an equal number of telegraph circuits may be provided without interfering with the telephone conversations. In this cable 35,000,000 lb. of lead-covered cable was required and the total number of poles

Table I—Telephones in United States—Distribution by States

Jan. 1, 1925, and Jan. 1, 1926

State	Number of Telephones Jan. 1, 1925	Jan. 1, 1926	State	Number of Telephones Jan. 1, 1925	Jan. 1, 1926	State	Number of Telephones Jan. 1, 1925	Jan. 1, 1926
Alabama	101,636	109,512	Maine	124,640	127,030	Oklahoma	240,897	256,719
Arizona	27,690	29,728	Maryland	174,154	180,826	Oregon	160,807	169,613
Arkansas	108,890	113,667	Massachusetts	795,960	808,194	Pennsylvania	1,210,950	1,281,314
California	953,288	1,027,552	Michigan	582,118	631,141	Rhode Island	105,781	106,706
Colorado	163,071	170,575	Minnesota	435,892	455,451	South Carolina	58,441	60,708
Connecticut	240,237	256,813	Mississippi	68,430	71,543	South Dakota	106,575	110,119
Delaware	25,397	26,406	Missouri	595,931	620,492	Tennessee	192,699	203,289
District of Columbia	117,205	127,977	Montana	55,079	56,221	Texas	525,600	557,889
Florida	106,935	127,594	Nebraska	282,784	284,695	Utah	56,755	59,423
Georgia	151,594	158,440	Nevada	11,123	11,720	Vermont	57,044	58,357
Idaho	50,068	51,617	New Hampshire	77,865	79,195	Virginia	163,635	170,637
Illinois	1,437,441	1,522,959	New Jersey	474,473	512,048	Washington	258,901	271,453
Indiana	517,532	535,426	New Mexico	19,018	19,921	West Virginia	136,016	141,027
Iowa	556,610	566,085	New York	2,137,188	2,292,650	Wisconsin	459,507	482,353
Kansas	370,684	380,509	North Carolina	135,068	142,738	Wyoming	26,835	27,471
Kentucky	219,596	223,444	North Dakota	80,360	83,276			
Louisiana	108,660	118,969	Ohio	1,005,698	1,054,426	United States	16,072,758	16,935,918

supporting it is 35,000. Telephone repeater stations are provided at intervals of about 50 miles and loading coils are inserted about a mile apart. It provides service with a delay in most cases not exceeding five minutes between New York and Chicago and, in addition, service between many intermediate points.

Machine-switching central offices, both of the panel and step-by-step types, as well as manual switchboards, have been benefited by continuous improvement. The use of machine switching is being increased, and at present more than 14 per cent of the telephones in the Bell system (not including connecting companies) are operated on a machine-switching basis. The total number of Bell system telephones so operated on Sept. 30, 1926, was more than 1,800,000.

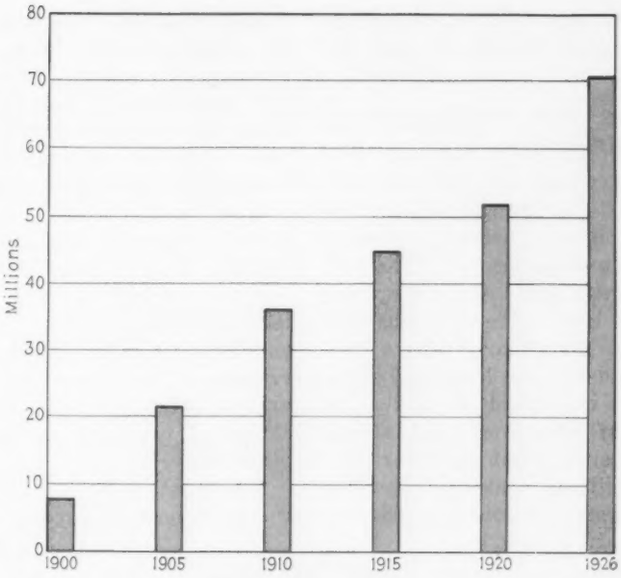


Fig. 5—Average Number of Daily Telephone Conversations in the United States

During the past year continued attention has been given toward furnishing telephone service that will at all times most fully meet the requirements of the users. A steady improvement has been made in speed and accuracy in handling telephone calls and also in the handling of such important service factors as the installation and moving of telephones, furnishing of directories, keeping lines in good working condition and the many other factors the satisfactory treatment of which is of vital importance to the telephone user.

Improvements in the methods of handling interoffice local calls have been recently applied in a number of large cities with successful results. These new methods are known by the designation "straightforward trunking." When a local call is made by a subscriber in one central office to a subscriber in a second central office area, it is completed through co-operation of two operators, one at each of the offices involved. Heretofore, under conditions prevailing in large cities, technical difficulties of various sorts have made it inconvenient for these operators to use for their own communication the pair of trunk conductors over which the subscribers are to talk, and it has been the usual practice for the operators to use a separate circuit, termed the call circuit, in order to get the most satisfactory and expeditious handling of traffic. These technical difficulties have been overcome by new developments that make possible, and even more accurate, the rapid handling of a call without the call circuit. With straightforward trunking, the operator at the originating office is enabled readily to select an idle trunk to the called office, an operator at that office is automatically and instantly connected to the trunk selected, and after being used by the operators for transferring the necessary information, the same trunk is used by the subscriber for talking. Straightforward trunking is used with even greater beneficial results for calls requiring two trunks in tandem and the co-operation of three operators.

In the toll and long-distance service success has been met with in increasing the area in which the subscriber may be connected in much the same way as he would be connected with some one located in the same exchange. It is now possible to complete a very large percentage of toll connections while the calling subscriber remains at the telephone.

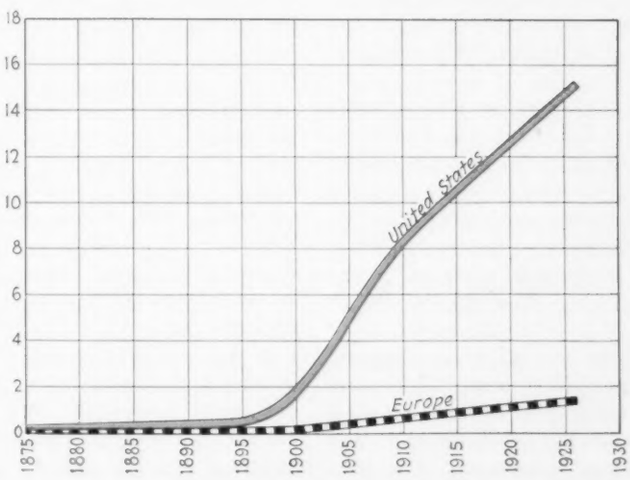


Fig. 6—Telephones per Hundred Population in United States and in Europe

Carrier Current Systems

The economic benefits of making one pair of wires do the work of several have long been recognized. An approach to this was the phantom circuit now in wide use on many long-distance and interurban circuits, which enables two pairs of wires to give three talking circuits. This benefit has been more fully realized within more recent years, due to the introduction, on open-wire circuits, of the "carrier current" systems. The use of these systems has considerably increased in the past year, and further large additions are in prospect. One noteworthy advance has been the first experimental installation of the "short haul carrier." The distance over which the circuit is operated is 80 miles. Heretofore it has not been economical to apply carrier currents for distances of less than about 150 miles.

In the telegraph equipment that permits the utilization of telephone lines in cables for telegraph purposes some worth-while advances have been made. A system of metallic telegraphy, superimposed on telephone circuits, utilizing a relay of great sensitiveness and adapted for use with long telephone cables, has been adopted.

Another type of system for long toll cables employing carrier currents of frequency within the voice range and utilizing pairs of wires that are not at the same time used for talking has also been put into operation. It is now readily

possible to establish twelve two-way telegraph channels using one circuit such as would ordinarily be used for regular telephone purposes.

CONSTRUCTION ECONOMIES OBTAINED BY USING MACHINE METHODS

In the telephone system fully half the plant is what is termed "outside plant" to distinguish it from the central offices, repeater stations and associated equipment. Throughout the past several years, in the tremendous construction program of the telephone companies, increasing use has been made of mechanical means to assist construction, particularly where construction of underground conduit, pole lines and cable is involved. Work has been completed in perfecting pole-hole boring machines of improved design and power-driven winches, the latter of great value for pulling in cable and for all heavy lifting, making it possible to realize the maximum efficiency of pole-derricks and similar construction apparatus. The importance of this type of mechanical assistance can be realized when one considers the fact that a matter of about 800,000 telephone poles have been set in the year 1926. As an illustration of improved efficiency, two men, with the aid of the boring machine, can accomplish, within a few minutes, work which would otherwise require hours to complete.

The quantity of timber in poles, crossarms and conduit used in telephone systems makes timber preservation against decay of great importance. In the Bell system alone there are upward of 15,000,000 poles. Effective preservatives and methods of applying them have been worked out and are now in extensive use throughout the telephone plant. Correct practice in this matter insures against undue increase in pole line maintenance costs with the growing scarcity and cost of timber products.

In the telephone exchange plant braid-covered rubber-insulated pairs of copper wires are used to connect the subscriber's premises with the terminals of the paper-insulated block cable or open-wire line. For many years 14-gage rubber-covered twisted pair was employed. This was followed by more economical types and recently a further reduction in the cost has been effected by the use of two 17-gage bronze wires laid parallel under a common braid. The reduction in the amount of material effected will be seen to be important when it is understood that the purchases of this type of wire in the Bell system alone aggregate more than $5,000,000 in a year.

Another activity that has been of considerable importance and that serves as an example of work being done on many other items is the standardization of tools used in the telephone plant. The benefits of standardization are obvious. It permits quantity purchasing, with consequent reduced prices; it permits the accumulation of central stocks for use in emergencies; plant employees transferred from one section of the country to another are already familiar with the tools employed; it insures the best type of article for the work in hand, and permits the use of standardized methods for performing plant operations. Within the past year or two more than 150 kinds of tools for use by the telephone plant forces have been standardized.

Another technical development that may be mentioned is increased effectiveness in the transmission of pictures over wires. A commercial service has been inaugurated between New York, Boston, Chicago, Cleveland and San Francisco, and other points will be added shortly. In addition to the commercial service for transmission of pictures, this system has been used in an experimental way as an aid to the police in the identification of criminals by transmitting fingerprints and other material.

The past year has seen further progress in the co-operation between communication and electrical supply companies in the solution of mutual problems arising from the physical relation of their wire systems. A report was issued by the joint general committee of the N.E.L.A. and the Bell telephone system, recommending principles and practices for the joint use of wood poles by supply and communication companies. Other recent work has consisted of joint research for determining the physical facts upon which can be based the development of practices to be recommended for general use by the communication and supply companies in order to permit the economic development of both with minimum restrictions on either.

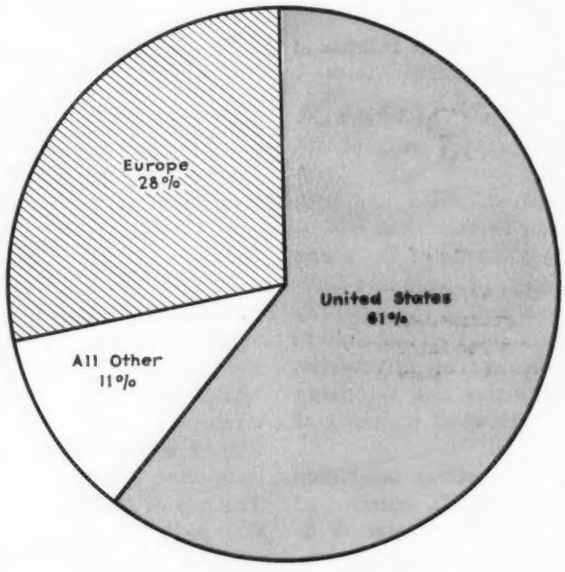


Fig. 8—Telephones in the World

As a result of continued prosecution of research work in analyzing the characteristics of speech and hearing and the application of the results to the best design of telephone systems and apparatus, the clearness and naturalness of electrical speech transmission is constantly being improved. The sounds that comprise speech and music involve, as is well known, complicated pressure variations. These, when converted into electrical energy through the medium of the telephone transmitter, may be resolved into a series of component sinusoidal waves. A large proportion of the energy of the voice lies in the low range of frequencies of a few hundred cycles, whereas the higher frequencies are especially important in providing clear articulation. The exact knowledge of the importance of different frequencies has proved to be of the greatest value in properly engineering apparatus and circuits so as to give clearer transmission of speech in an economical manner.

A service which some far-seeing persons visualize as being rendered over communication circuits of the future is television—the seeing of the person with whom conversation is being held. Reception of still pictures can be conceived more readily than motion pictures, but the latter do not seem impossible considering recent accomplishments.

Year's Financing

Breaks All Records

Power and Light Companies Secure Much Larger Volume of New Capital Through Sale of Bond Issues than During 1925

NINETEEN-TWENTY-SIX established a new high record in the volume of financing in the light and power industry. The prediction made in these columns at the end of 1925 that 1926 operations would require $1,300,000,000 has proved substantially accurate. Allowing for maturities and retirements, this brings the total investment in the light and power industry to approximately $8,400,000,000, from $7,500,000,000 at the end of 1925. Capital requirements for 1927 will probably be marginally greater than those of 1926.

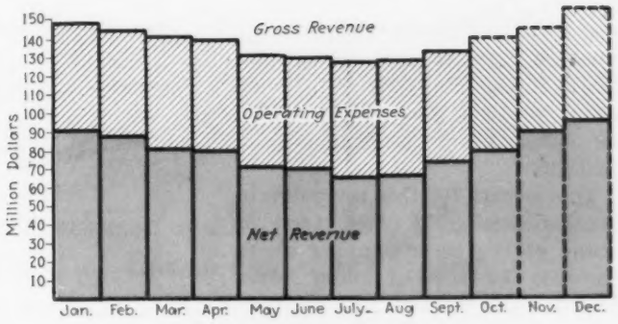
As indicated in the accompanying summary of the year's financing, funds are being secured on more favorable terms than last year and, in fact, than for some years back. Mortgage bonds were marketed during 1924 on an average yield basis of 6 per cent and during 1925 at an average of 5.48 per cent. The average in 1926 was reduced still further to 5.40 per cent. Debenture obligations were marketed during 1924 on a yield basis of 6.25 per cent. In the year 1925 the average dropped to a remarkably low average, 5.30 per cent. These figures included short-term notes. For 1926 the average for debentures was somewhat higher, being 6.20 per cent and for notes 5.50 per cent. Preferred stocks in 1924 were sold on a basis averaging slightly higher than 7 per cent. In 1925 such offerings were made on an average 6.87 per cent basis, whereas the 1926 average was 6.84.

The 1925 swing from senior to junior securities has been completely reversed in 1926. Out of the total of $1,389,564,982 securities sold during the year, bonds accounted for $807,860,000, against $496,094,500 the year before, or 59 per cent of the total, against 39 per cent. The total of debentures and notes advanced from $172,430,000 in 1925 to $199,300,000 in the past year; preferred stocks dropped from $280,198,510 to approxi-

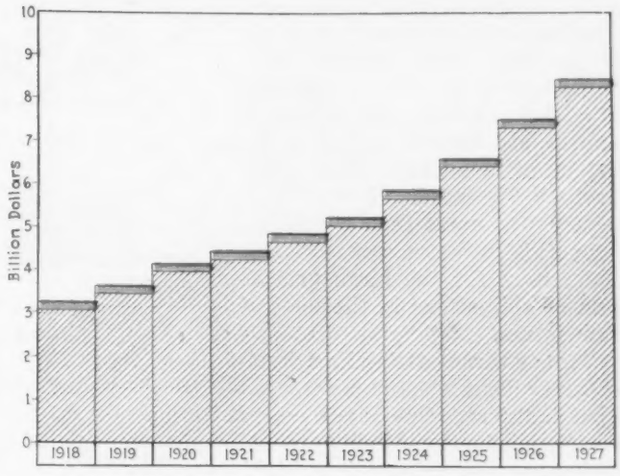
Electric Light and Power Security Issues in 1926

Public Sales by Investment Houses

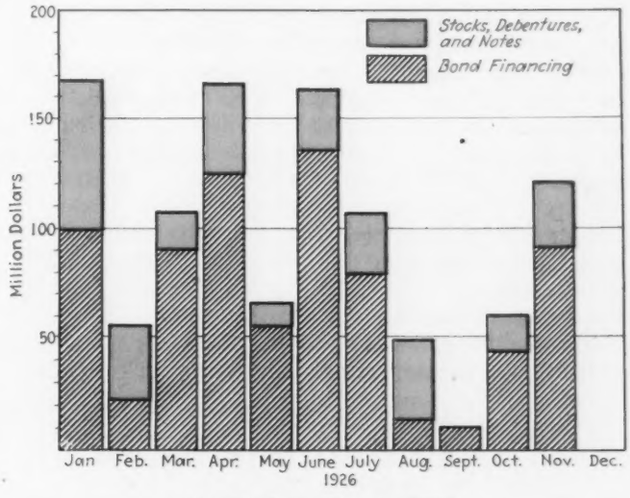
	Amount of Issue	
Mortgage Bonds (average yield 5.40 per cent):		
9 issues yielding from 4.80 to 4.95 per cent	$80,635,000	
22 issues yielding from 5.00 to 5.08 per cent	96,585,000	
34 issues yielding from 5.10 to 5.25 per cent	248,128,000	
18 issues yielding from 5.27 to 5.50 per cent	152,179,000	
16 issues yielding from 5.55 to 5.70 per cent	75,798,000	
18 issues yielding from 5.71 to 6.09 per cent	113,069,000	
9 issues yielding from 6.10 to 6.22 per cent	17,816,000	
8 issues yielding from 6.25 to 6.65 per cent	29,650,000	
134 issues		$813,860,000
Debentures (average yield 6.20 per cent):		
7 issues yielding from 5.10 to 6.08 per cent	$59,500,000	
6 issues yielding from 6.10 to 6.25 per cent	33,000,000	
7 issues yielding from 6.30 to 6.45 per cent	61,400,000	
3 issues yielding from 6.50 to 6.75 per cent	4,350,000	
23 issues		158,250,000
Notes (average yield 5.50 per cent):		
4 issues yielding from 5.00 to 5.05 per cent	$14,200,000	
4 issues yielding from 5.23 to 5.50 per cent	10,750,000	
7 issues yielding from 5.52 to 6.00 per cent	8,050,000	
6 issues yielding from 6.04 to 7.00 per cent	8,050,000	
21 issues		41,050,000
Preferred Stock (average yield 6.84 per cent):		
8 issues yielding from 5.87 to 6.40 per cent	$40,866,000	
8 issues yielding from 6.50 to 6.60 per cent	13,389,200	
8 issues yielding from 6.85 to 7.00 per cent	35,087,742	
8 issues yielding from 7.10 to 7.29 per cent	19,687,040	
8 issues yielding from 7.30 to 7.37 per cent	14,675,000	
38 issues		123,704,982
Common Stock:		
3 issues		11,800,000
Total of all issues of year		1,148,664,982
Estimated local sales to customers*		246,900,000
		$1,395,564,982



Business Operations in 1926



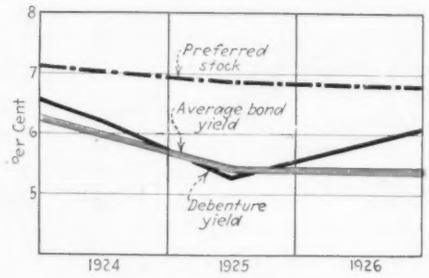
Total Invested Capital on Jan. 1, 1927, Is 8.4 Billions



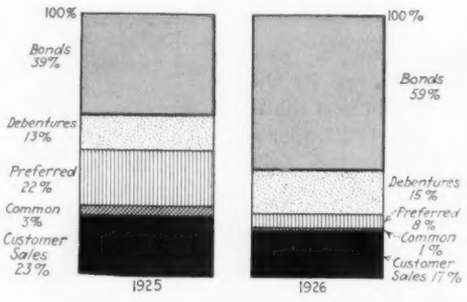
Monthly Financing in 1926

mately $123,000,000, and common dropped from $33,500,000 in 1925 to $11,800,000 last year. Customer sales for 1925 were $296,000,000, as compared with $246,900,000 in 1926.

One reason for this reversion to bond financing is seen from a study of the accompanying chart showing the trend of money rates. It will be noted that bond money dropped more rapidly than that of debentures or stocks. The analysis is somewhat misleading, however, unless cognizance be taken of the large volume of bonds sold in connection with the retirement of higher priced issues. Although figures are not yet complete for the entire year, the total up to the first of December of refunding money was more than $369,000,000; this indicates rather clearly the reason for the large proportion of obligations in the total of new issues.



Low Yield Rates Encouraged Financing in 1926



Bonds Were Favored in Utility Financing in 1926

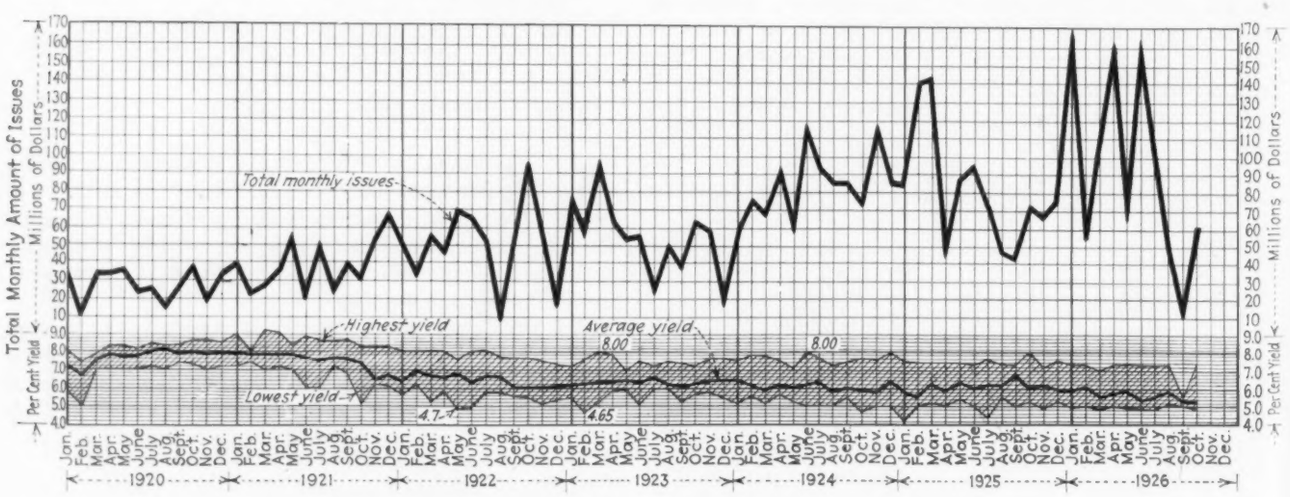
Two or three outstanding developments dominate the current trend in the power and light industry. One is the reorganization of corporate structures formerly built up under various legislative and other restrictions into highly complicated groups and relationships and at higher interest cost. Funds for some years have been obtained at higher rates than those now ruling. Furthermore, the old-style mortgage covering bond issues was rigid and unfitted for a growing concern. Usually it was not subject to call or to further issue. Current reorganizations in the industry are directed to the correction of these defects; their aim is to reduce operating costs through interconnection, to decrease bond interest charges, to meet requirements set up by certain states for trust and savings bank investments, and partly, no doubt, with a view to increasing confidence in the minds of investors and the general public.

In connection with the reorganizations referred to above, real progress has been made during the year in reducing the number of subsidiary companies, in retiring outstanding issues and in straightening out the complex relationships formerly existing. The process has frequently involved the calling of outstanding bond issues and the exchange of preferred stock. Not only have relationships been simplified in this way but saving has been effected by the wiping out of higher-priced obligations and the issuing of new securities at a lower coupon rate.

The prediction sometimes made that power and light companies are approaching the saturation point in demand for their products seems contradicted by existing and prospective power requirements in relation to the available supply. Revenue has shown a further substantial increase this year, whereas operating costs have been more or less stabilized owing to the advantages of interconnection and to other economies introduced. In many instances these costs of operation have been actually reduced during the past two or three years, allowing for an increase in earnings as well as a stronger surplus account, and making the securities of the respective companies a more attractive investment. A statement of the gross and net revenues and operating costs, by months, during the year follows:

Statement of Revenue and Expenses During 1926

	Gross Revenue	Operating Costs	Net Revenue
January	$149,700,000	$58,700,000	$91,000,000
February	145,000,000	56,900,000	88,100,000
March	142,000,000	59,800,000	82,200,000
April	140,000,000	58,700,000	81,300,000
May	133,800,000	59,700,000	74,100,000
June	129,700,000	61,000,000	68,700,000
July	127,100,000	59,300,000	67,800,000
August	127,800,000	59,400,000	68,400,000
September	135,500,000	60,500,000	75,000,000
October	141,000,000	63,500,000	77,500,000
November	155,200,000	66,300,000	88,900,000
December	156,700,000	70,800,000	85,900,000
Total for year	$1,683,500,000	$734,600,000	$948,900,000



Financial Activities and Trends in the Light and Power Industry

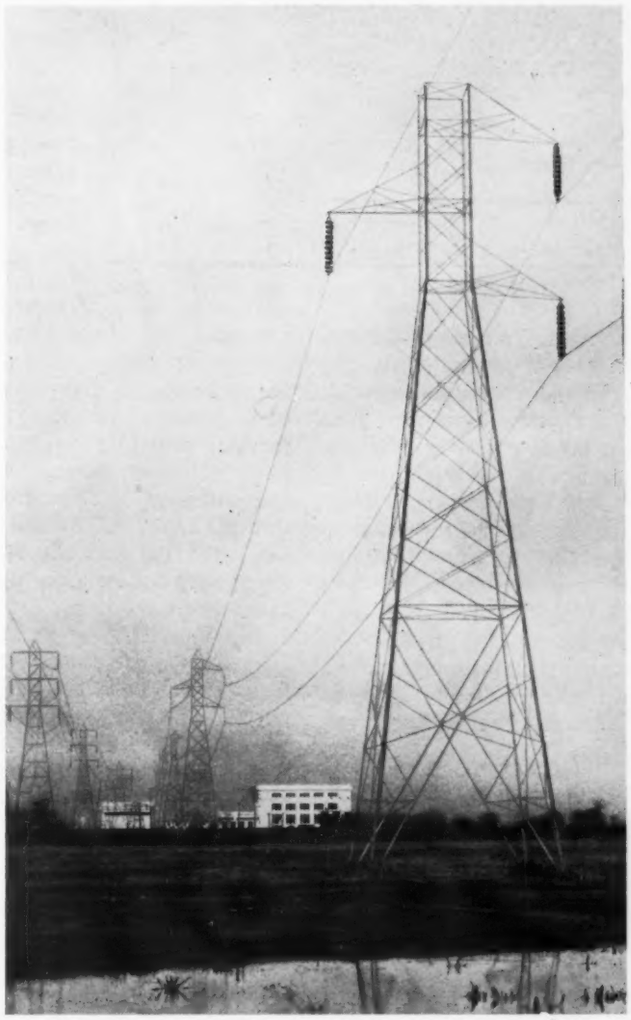
Changes in Utility Ownership

Many Small Private and Municipal Properties Purchased and Merged Into a Co-ordinated Transmission System—Very Active Period of Consolidation in Ownership and Simplification of Organization and Administration

THIS has been a very busy year in the utility industry. General business conditions have been favorable, money rates have been easy, utility credit has been good and as a consequence the industry has expanded and consolidated very rapidly.

Many small private plants and many small municipal plants have been purchased and merged into a co-ordinated system. Other properties of the same character have been absorbed by expanded transmission systems. These small properties have been taken over purely on an economic and service basis. The large modern system, with efficient power production sources, with the advantages offered by diversity, skilled management, interconnection and ample financial resources, has been able to offer customers on small properties cheaper and better service.

Very great activity in the way of buying small properties has occurred in the South, Southwest and Middle West. In Florida and in Georgia many small municipal and private plants have been taken over and made part of a transmission system under the control of large utility organizations. The Florida Power & Light Company, Stone & Webster and the Fitkin interests have been active in this region. In one year a major transmission system has been built on the Florida east coast by the Florida Power & Light Company to serve twelve large cities, including Miami, St. Augustine and Sarasota. On the west coast and in southern Georgia the General Engineering & Management Corporation has built an extensive system.

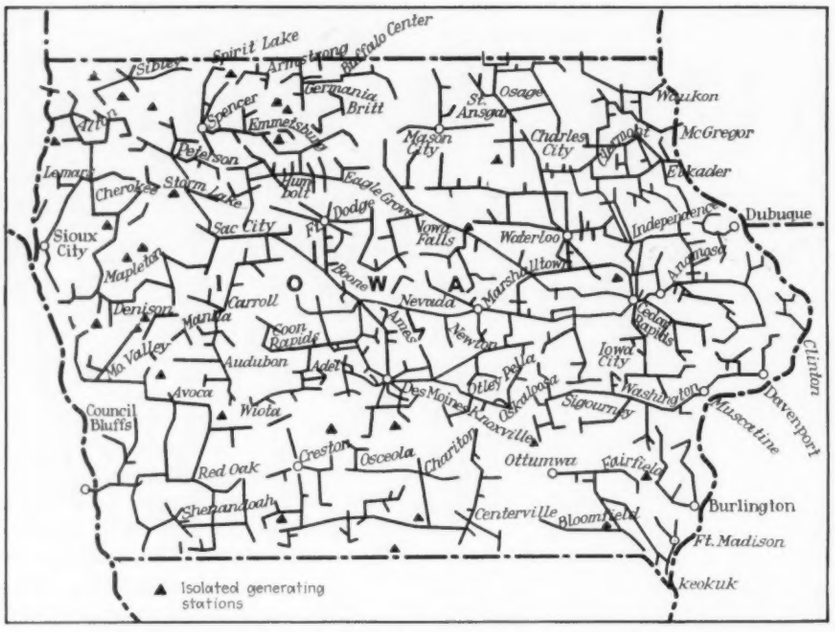


Transmission Systems Have Eliminated Many Small Generating Stations

In the Southwest there has been a very active market for utilities, and many of the larger utility groups have made purchases and built systems. The Central & South West Utilities Company, a subsidiary of the Middle West Utilities Company, now serves about 200 communities in Texas, Oklahoma and Arkansas. This company has absorbed the Central Power & Light Company, serving 92 communities in southwest Texas and the Panhandle; the Texas Central Power Company, serving 56 communities in central Texas; the Valley Electric & Ice Company, serving eighteen towns in Texas; the East Texas Public Service Company, several small properties in Arkansas and the Southwestern Public Service Company.

The Arkansas Power & Light Company now serves more than 100 communities in Arkansas, Louisiana and Mississippi through the control or purchase of about twelve utility properties in the territory. Day & Zimmermann have bought several properties in the Southwest, including properties in Carlsbad, N. M.; Amarillo, Tex., and the Gulf Public Service Company in Louisiana. The Oklahoma Gas & Electric Company has extended its holdings in Oklahoma, and the Southwestern Public Service Company has taken over many properties in the southwestern part of the same state. Several other utility operators have purchased properties in Arkansas, Louisiana and Texas.

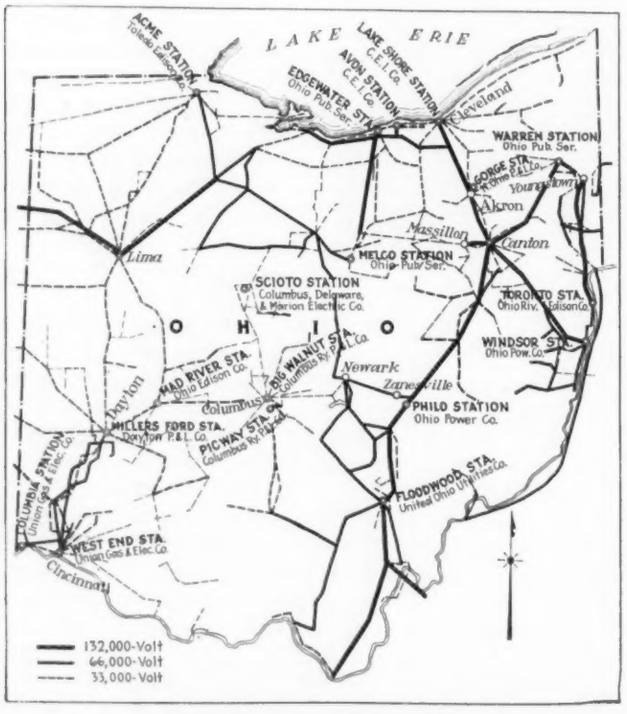
In the larger aspects of utility operations in the South the growth of the Southeastern Power & Light Company is remarkable. Its area of influence is the eastern half of Mississippi, all of Alabama, northern Georgia and central South Carolina. Several comparatively large utilities have been merged into the larger system and will reap the benefits to be expected from the diversity now available. Water powers and steam plants can now be utilized on a widespread system economy basis, and the co-ordinated operating and selling efforts now made possible should react to give a very



Iowa Interconnections Are Typical of Growth of Systems in the West

rapid electrical development in the territory served.

One other major happening that will benefit the South is the interconnection of the Carolina Power & Light and the American Gas & Electric systems. This interconnection now affords a large power supply for emergency use in the South from the coal-burning systems on the north and relieves Southern properties from the necessity of building large steam reserve plants. In Alabama and Tennessee, fortunately, there is ample coal and several steam plants are available, and thus the whole South can use its hydro resources fully and yet have steam reserves for emergency use in Alabama and Tennessee on the west and in the interconnections of Carolina on the east. In a similar manner surplus hydro power can be sent to adjacent fuel-burning systems when the streams are full and thus a give-and-take power interchange can be worked out on a maximum regional economy basis with a minimum in regional reserve capacity because of the great diversity now available.



Major Interconnections in Ohio

MISSISSIPPI VALLEY GROWING

Out beyond the Mississippi River, in Kansas, Missouri, Nebraska, Iowa and the Dakotas there has been a very rapid development in utility systems. Many cities are growing rapidly and several utility organizations have entered the region, purchased properties and built transmission systems. Other organizations already on the ground have expanded rapidly and taken over many small private and municipal properties.

The Central States Power & Light Company, with headquarters at Davenport, Iowa, has expanded greatly by purchase and merger. The Arkansas Public Service Company, Missouri Electric Power Company, Missouri Power Development Company and the Southeast Missouri Public Service Company have been merged into this company, together with the 22 communities they serve. Also the Northeastern Power Company, with 75 communities served in Iowa; the Central Light & Power Company, serving 11 communities in Iowa, and the Nebraska Electric Power Company, serving 22 communities in Nebraska, have been taken over.

The Central West Public Service Company has taken over service to 22 communities in South Dakota, North Dakota, Iowa and Nebraska. Day & Zimmermann have purchased several properties in South Dakota and Nebraska. The Inland Power & Light serves twenty communities in Kansas, Missouri and Arkansas. A typical map of the growth of interconnections is shown in the accompanying map of Iowa.

Further west several property changes have occurred, notably in Arizona, New Mexico and Colorado. Distances are so great in these regions between properties that the new owners are improving service, increasing sales and strengthening management in the scattered properties.

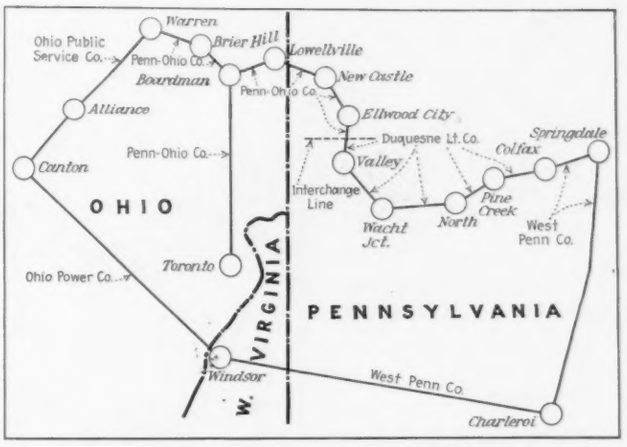
In the far West the territory has been quite well covered with extensive systems, and during the year the major changes have been concerned with consolidating and expanding existing properties and in building additional service facilities.

In New England there has been quite a change in utility organizations. Along the northern tier the Middle West Utilities has purchased several properties, reorganized their managements and extended facilities. In central New England a closely linked association has been made that makes possible operating interconnections between the different properties. The New England Company and its subsidiaries and the Narragansett Lighting Company now form the New England Power Association. The United Gas Improvement Company has expanded in Connecticut and together with the Hartford Electric Light Company and the New England Power Association forms a part of a very extensive

interconnection. In New York the Buffalo, Niagara & Eastern Company unites the interests of the Niagara Falls Power Company, the Buffalo General Electric Company and the Niagara, Lockport & Ontario Power Company into one interconnected and extensive system, which in turn ties in with the Adirondack Light & Power system and several utilities of the Mohawk Hudson Power Corporation.

Close interlinking of power supply in New York City, New Jersey and Philadelphia has been accomplished by interconnecting lines and the economies incidental to great load diversity are being realized. Lines now join properties from Boston to Chicago and points west and a spider web of circuits now rests on the entire area east of the Mississippi River.

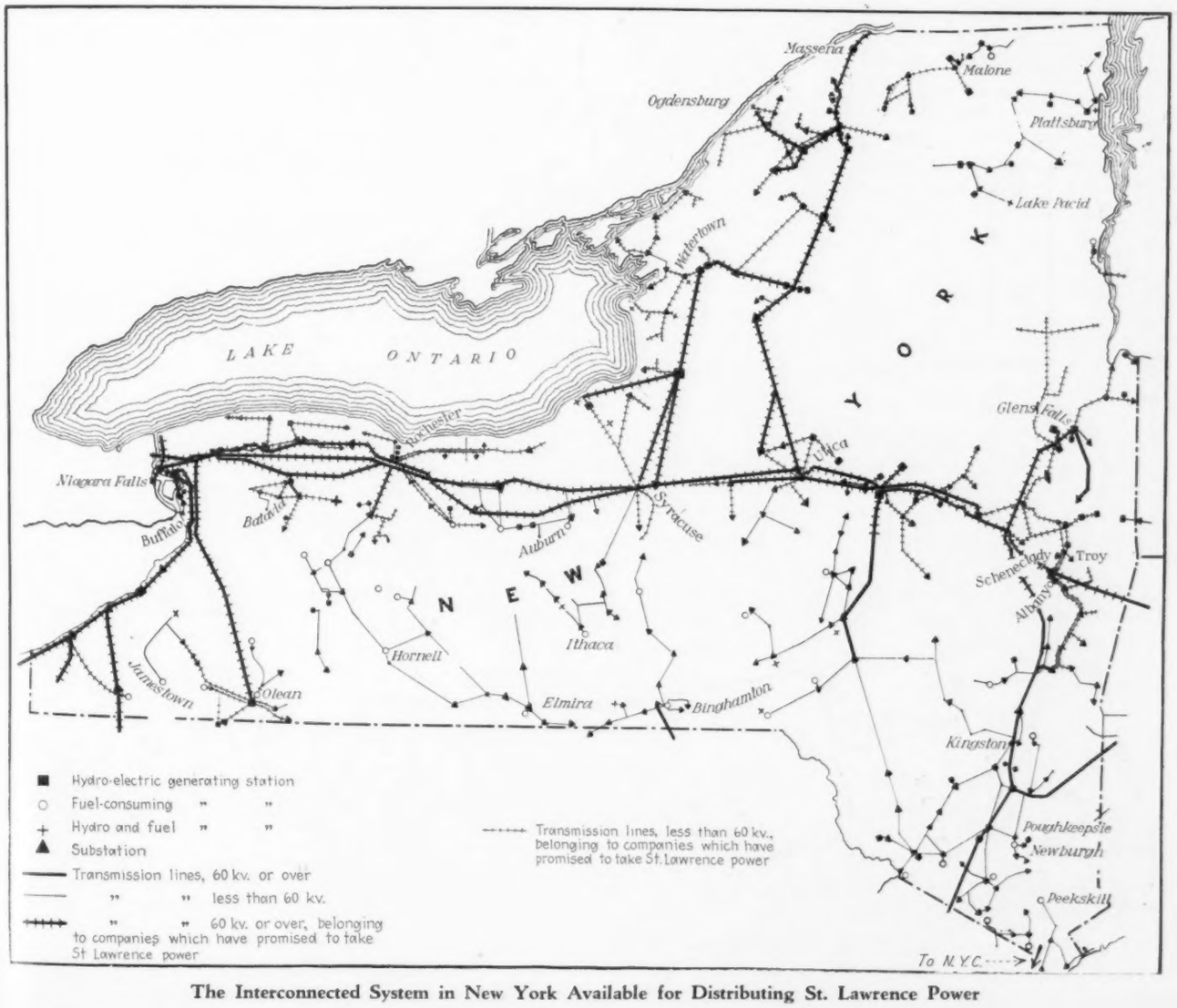
In West Virginia, Kentucky and Virginia the Appalachian Electric Power Company now operates as a very extensive part of the American Gas & Electric Company system. The Fitkin interests have expanded in Virginia as in other regions and now have a group of properties in the Shenandoah Valley and in Norfolk and vicinity.



An Interconnected Loop Serving a Large Industrial Load

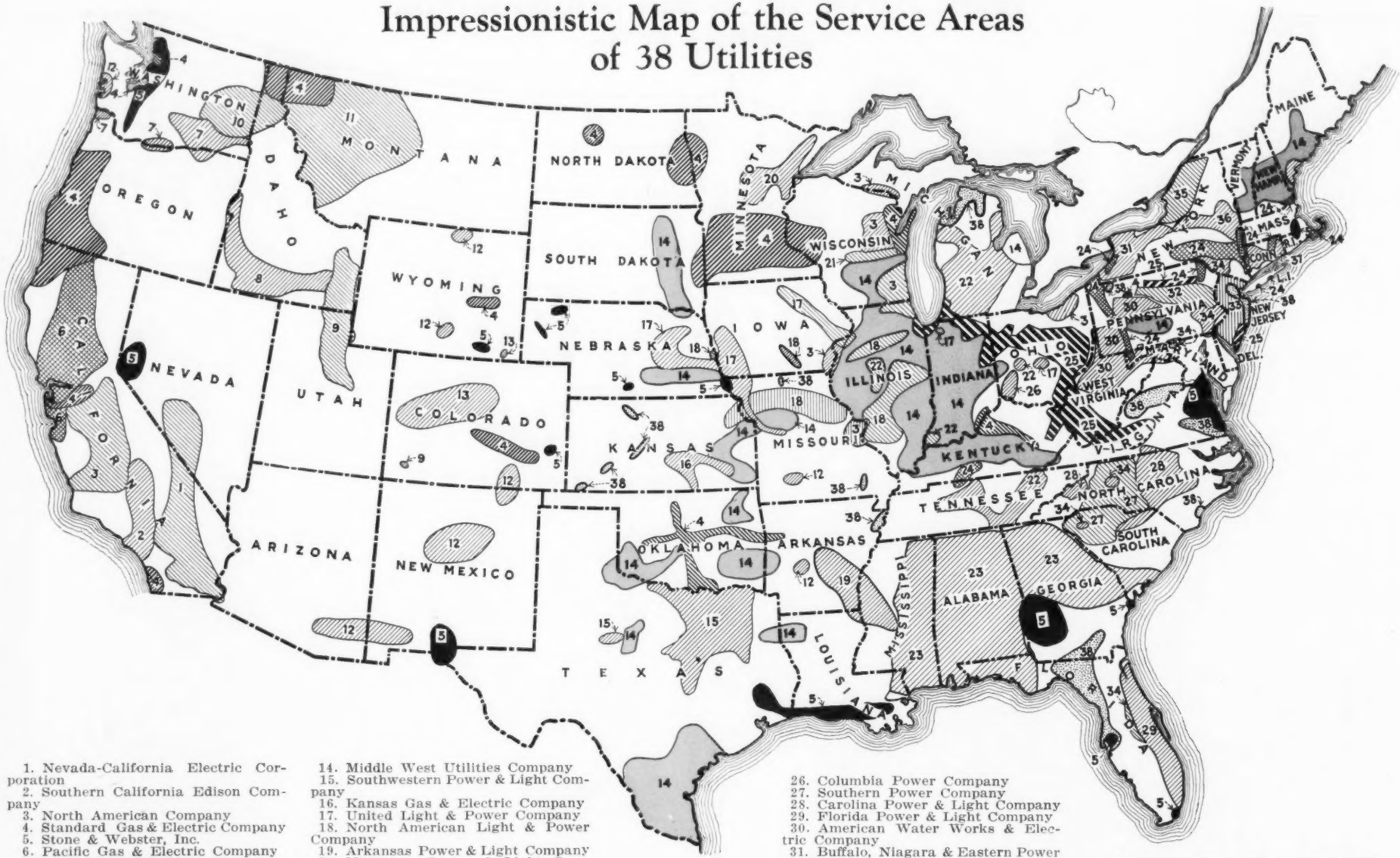
Status of Large Projects

Muscle Shoals has continued to hold the political limelight during the year and still remains a political problem. The accompanying map shows clearly how Muscle Shoals power could be absorbed in the great interconnected electrical systems now in existence. This power would mean a great deal to the whole territory if properly backed by adequate steam reserves and water powers from other watersheds. No one ventures to predict when Muscle Shoals will be made available to the country, for the political assets of a long-drawn-out discussion of fertilizer seem to be agreed upon by politicians as more valuable than the economic and



The Interconnected System in New York Available for Distributing St. Lawrence Power

Impressionistic Map of the Service Areas of 38 Utilities



1. Nevada-California Electric Corporation
2. Southern California Edison Company
3. North American Company
4. Standard Gas & Electric Company
5. Stone & Webster, Inc.
6. Pacific Gas & Electric Company
7. Pacific Power & Light Company
8. Idaho Power Company
9. Utah Power & Light Company
10. Washington Water Power Company
11. Montana Power Company
12. Federal Light & Traction Company
13. Public Service Company of Colorado
14. Middle West Utilities Company
15. Southwestern Power & Light Company
16. Kansas Gas & Electric Company
17. United Light & Power Company
18. North American Light & Power Company
19. Arkansas Power & Light Company
20. Minnesota Power & Light Company
21. Wisconsin Power & Light Company
22. Commonwealth Power Corp.
23. Southeastern Power & Light Company
24. Associated Gas & Electric Company
25. American Gas & Electric Company
26. Columbia Power Company
27. Southern Power Company
28. Carolina Power & Light Company
29. Florida Power & Light Company
30. American Water Works & Electric Company
31. Buffalo, Niagara & Eastern Power Corporation
32. Pennsylvania Power & Light Company
33. Public Service Electric & Gas Company
34. General Gas & Electric Corporation
35. Power Corporation of New York
36. Mohawk Hudson Power Corporation
37. Connecticut Light & Power Company
38. General Engineering & Management Corporation

Note: These utilities are the predominant service companies in the territories shown. Other utilities may give service in local areas within the regions indicated.

Many Municipal Plants Absorbed

Municipal enterprises which have been sold to private companies or which have discontinued generation and are now receiving service from private companies' transmission systems

Alabama
Good Water
Ozark
Slocomb

Arkansas
Gravette
Hamburg
Osceola
Searcy
Siloam Springs
Sulphur Springs

California
Santa Cruz

Colorado
Brush
Sedgwick

Florida
Callahan
Coral Gables
Delray
Florida City
Lakeland
Lynn Haven
Madison
Millville
Monticello
Punnell
Punta Gorda
Sarasota
Umatilla

Georgia
Baxley
Blackshear
Claxton
Colquitt
Dawson
Douglasville
Dublin
Greensboro
Louisville
Lyons
Midville
Reynolds
Wadley

Idaho
Victor

Illinois
Bellflower
Brookport
Columbia
Creal Springs
Divernon
Fisher
Kempton
Kinmundy
Lombard
New Liberty
Paloma
Sibley

Indiana
Birdseye
Cannelton
Gary
Loogootee
Miller
Tell City

Iowa
Bassett
Eddyville
Galva
Kanawha
Laurens
McCausland
Merrill
Pioneer

Kansas
Altoona
Burns
Cheney
Edgerton
Elk City
Eskridge
Garden Plain
Goddard
Haddam
Hanover
Harveyville
Hillsboro
Madison
Oketo

Kentucky
Clarkson
Eddyville
Fredonia
Harrodsburg
Morehead
Murray
Simpsonville
Tell City
Wickliffe

Louisiana
Bastrop
Lake Arthur
Mansura

Massachusetts
Reading

Michigan
Addison
Deckerville
Frankenmuth
Reed City
Snover
Ypsilanti

Minnesota
Alpha
Echo
Erskine
Frazee
Mendota
Oklee
Rushmore

Mississippi
Senatobia
Yazoo City

Missouri
Easton
Elsberry
Fredericktown
Matson
Middle River
Plummer
St. Joseph
Seneca

Montana
Bancroft
Glasgow

Nebraska
Dixon
Gordon
Homer
Sidney
Wathill

New Jersey
Atlantic Highlands
Barnegat
Longport

New Mexico
Alamogordo

New York
De Ruyter
Lynbrook
Savona

North Carolina
Bladensboro
Elkins
Jonesville
Kernersville
Littleton
Mt. Airy
Norlina
Randleman
Warrenton

North Dakota
Dodge
Grand Forks
Hannaford
Hatton
Lankin
Michigan
Watford
White Earth

Ohio
Ansonia
Chardon
Conneaut
Manchester
Marietta
Mt. Sterling
Oxford
Salineville

Oklahoma
Apache
Choctaw
Hammon
Jones City
Lone Wolf
McLoud
Morrison
Rocky
Sayre
Shattuck
Stonewall
Talihina
Weatherford

Pennsylvania
Brookville
Port Alleghany

South Carolina
Branchville
Sumter
Williston

South Dakota
Leola
McIntosh
Roscoe
Vienna

Tennessee
Gleason
McKensie
Paris

Texas
Canton
Edinburg
McLean
Nacogdoches
St. Jo
Wellington

Utah
Green River

Virginia
Tappahannock
Urbana

Washington
Oakville

Wisconsin
Blanchardville
Ft. Atkinson
Fox Lake
Greenwood
Loyal
Middleton
Milton
Milton Junction
Nenah
Rib Lake
Ridgeway
Westby

Canada
Lunenburg (N. S.)
St. Jerome (Que.)
Vegreville (Alta.)

social development of the surrounding communities.

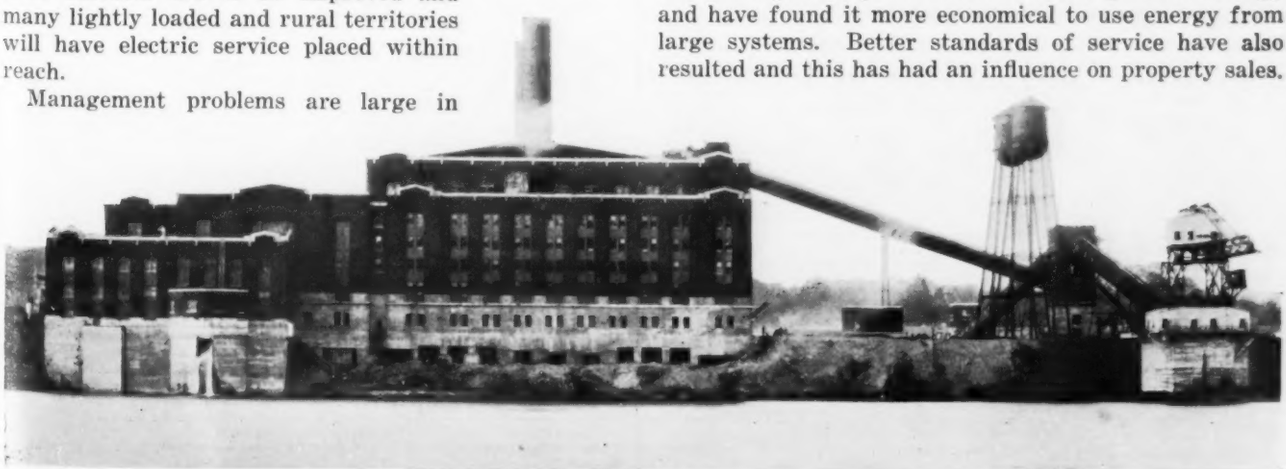
The great St. Lawrence River power development scheme continues to excite political and economic interest on both sides of the river. Little actual progress has been made in reconciling the views of Canada, Quebec, Ontario, New York and the United States Federal Power Commission. It is to be hoped the development will be made possible politically in the near future, for the power is needed on both sides of the border and the great economies achieved in steam power plants make an ever-narrowing radius for the economic transmission distance for expensive hydro developments. The accompanying map shows how St. Lawrence power might well be distributed to the great interconnected power system in the United States, and a similar large interconnected system exists in Canada.

It is expected that the purchase and merger of small properties and the welding together of single units into closely managed groups will react to benefit the industry. Operating costs should be decreased through a reduction of operating expenses, the greater use of large stations and the fuller utilization of water powers. Also services are to be improved and many lightly loaded and rural territories will have electric service placed within reach.

Management problems are large in connection with the syndicates and large operating groups. In finance, engineering, accounting and sales there have been problems of organization to solve. In most respects the policy of direct responsibility and decentralization of authority has been found best and the top organization acts more or less as adviser and consultant on policy and practice.

Public criticism of mergers has been heard in some cases because conditions have not been well understood. In some cases rumors have been heard of high prices paid for properties, but usually these are unfounded. A key property in a region may be necessary to the success of a large number of small properties operated as an extensive system and this may justify a higher market value than would be warranted by existing business on the property. In other cases poor sales work in the past may warrant a high price based on earnings that would follow aggressive commercial efforts.

The best evidence of the economies possible with service from large systems is afforded by the large number of small municipal plants taken over entirely or which buy power wholesale. In all sections plants of this type and small private plants have ceased to generate energy and have found it more economical to use energy from large systems. Better standards of service have also resulted and this has had an influence on property sales.



Columbia Power Station Is Typical of the Large Economical Stations Serving Large Systems

Utility Mergers and Purchases in 1926

Companies Involved	Territory Served	Date of Merger
Adirondack Power & Light Corp. (Schenectady, N. Y.)		
(Subsidiary of Mohawk Hudson Power Corp.):		
Adirondack & Southern, Inc.	Schenectady, N. Y.	Jan.
Central New York Power Corp.	Canastota, N. Y.	*May
Hadley Light & Power Co.	Hadley, N. Y.	*Jan.
Kanes Falls Electric Co.	Glens Falls, N. Y.	Jan.
Granville Gas & Electric Co.	Granville, N. Y.	July
North Creek Electric Co.	Johnsburg, N. Y.	*Nov.
Port Henry Light, Heat & Power Co.	Port Henry, N. Y.	*Dec.
Riddell Electric Light Co.	Riddell, N. Y.	*Jan.
Schroon Lake Lighting Corp.	Schroon Lake, N. Y.	*Jan.
South Glens Falls Street Lighting System	South Glens Falls, N.	*Jan.
Allied Utilities Corp. (Mills Bldg., Washington, D. C.):		
Mountain States Utilities Co.	W. Va.	*Sept.
Midland Electric Service Co.	West Union, W. Va.	*Nov.
Salem Electric Co.	Salem, W. Va.	*Nov.
American Gas & Electric Co.:		
See also Appalachian Electric Power Co.		
Electric Co. of New Jersey		
Atlantic City Electric Co. (N. J.):		
Municipal Electric System	Longport, N. J.	Nov.
Ohio Power Co. (Canton):		
Huron Valley Light & Power Co.	Plymouth, Ohio	Aug.
Municipal Plant	Salineville, Ohio	*Jan.
American Utilities Co. (Harrisburg, Pa.):		
(Gannett, Seelye & Fleming, Inc.):		
Arkansas General Utilities Co.	Warren, Ark.	May
Republic Power & Service Co.	El Dorado, Smackover and Warren, Ark.	*Aug.
Louisiana Public Utilities Co.	Morgan City, La.	May
Franklinton Light & Power Co.	Franklinton, La.	May
Leesville Light & Water Works Co.	Leesville, La.	May
Morgan City Ice & Electric Co.	Morgan City, La.	May
Republic Power & Service Co.	De Rider and Oakdale, La.	May
St. Tammany Ice & Manu. Co.	Covington, Mandeville, and Abita Springs, La.	May
Selig-Davis Light & Power Co.	Farmersville, La.	May
Slidell Ice & Light Co.	Slidell, La.	May
Mansfield Light & Power Co.	Mansfield, La.	May
Missouri General Utilities Co.	Perryville, Mo.	*May
Bloomfield Elec. Light & Pwr. Co.	Bloomfield, Mo.	*May
Missouri Electric Power Co.	Ste. Genevieve, Mo.	*May
Perry County Ice, Light & Pwr. Co.	Perryville, Mo.	*May
Twin City Light & Power Co.	Lutesville, Mo.	May
Oklahoma Northern Utilities Co.	Ponca City, Okla.	May
Blackwell Electric High Line Co.	Blackwell, Okla.	May
American Water Works & Electric Co., Inc.:		
West Penn Electric Co.		*Mar.
Keystone Power Corp.	Ridgeway, Pa.	*Mar.
Potomac Edison Co.	Hagerstown, Md.	*Mar.
West Penn Co.	Pittsburgh, Pa.	*Mar.
Monongelula West Penn. Public Service Co. (Fairmont, W. Va.):		
Electric Service System	Bethany, W. Va.	Aug.
Weston Electric Light, Power & Water Co.	Weston, W. Va.	*Oct.
Appalachian Electric Power Co.	Western Virginia, Southern West Virginia and Eastern Kentucky	*May
(Under supervision of American Gas & Electric Co.):		
Appalachian Power Co.	Bluefield, W. Va.	*May
Gilbert Water & Power Co.	Gilbert, W. Va.	Sept.
Appalachian Power & Light Co.	Charleston, W. Va.	*May
Boyd County Electric Co.	Ashland, Ky.	*May
Central Virginia Power Co.		*May
Consolidated Power & Light Co.	Huntington, W. Va.	*May
Chesapeake Electric Co.	Chesapeake, Ohio.	*April
Dunbar Light & Power Co.	Dunbar, W. Va.	*May
Gate City Light & Power Co.	Gate City, Va.	*May
Interstate Power Co.	Hartland, W. Va.	*May
Kanawha Valley Power Co.	South Charleston, W. Va.	*May
Kentucky & West Virginia Power Co.	Huntington, W. Va.	*May
Lynchburg Traction & Light Co.	Lynchburg, Va.	*May
New River Development Co.	Pearisburg, Va.	*May
Roanoke Railway & Electric Co.	Roanoke, Va.	*May
St. Albans Electric Light & Power Co.	St. Albans, W. Va.	*May
West Virginia Water & Electric Co.	Charleston, W. Va.	*May
Arkansas Power & Light Co.		
(Subsidiary of Electric Power & Light Corp., supervised by Electric Bond & Share Co.):		
Arkansas Central Power Co.	Little Rock, Ark.	*Oct.
Municipal Electric & Water Plant	Searcy, Ark.	Nov.
Arkansas Light & Power Co.	Pine Bluff, Ark.	*Oct.
Arkansas Public Utilities	Heber Springs	*Nov.
Armstrong Lighting, Ice & Water Co.	De Vall's Bluff, Ark.	Mar.
Marvell Light & Ice Co.	Marvell, Ark.	June
Municipal Water & Light Plant	Hamburg, Ark.	Nov.
East Arkansas Power & Light Co.		*Oct.
Pine Bluff Co.	Pine Bluff, Ark.	*Oct.
Associated Gas & Electric Co.:		
See also Harlem Valley Electric Corp.		
Associated Electric Co.		*April
Associated Pennsylvania Corp.		Mar.
Penn Public Service Corp.	Western Pennsylvania and Eastern Maryland.	April
Sheffield Electric Light & Pwr. Co.	Sheffield, Pa.	Sept.
Depew & Lancaster Group	Western New York	April
Fred W. Young Elec. Pl. & Sys.	Western New York	*Jan.
Eastern New York Group	Northeastern New York, and along Vermont, Massachusetts and Connecticut border	April
Eastern New York Elec. & Gas Co. (Granville, N. Y.):		
Dwaas Electric Co.	Hudson Falls, N. Y.	*May
Halfmoon Lt., Heat & Pwr. Co.	Mechanicville, N. Y.	*May
Salem Lt., Heat & Power Co.	Salem, N. Y.	*May
Kentucky-Tennessee Group	60 communities	April
Kentucky-Tennessee Light & Power Co. (Bowling Green, Ky.):		
Municipal Plants	Murray, Ky.	*July
	Gleason, Tenn.	Nov.
	McKenzie, Tenn.	*June
Ohio River Power Co. (Cannelton, Ind.):		
Cannelton (Municipal) Pubic Service Co.	Cannelton, Ind.	*Mar.
Cloverport Ice & Light Co.	Cloverport, Ky.	*Jan.
Hardinsburg Elec. Light Co.	Hardinsburg, Ky.	*Jan.
Hawesville Water & Lt. Co.	Hawesville, Ky.	*Jan.
Lewisport Electric Light & Water Co.	Lewisport, Ky.	*Jan.
Municipal Electric Light & Water Plant	Tell City, Ind.	*Mar.
Three Forks Utilities	Beattyville, Ky.	Jan.
Long Island Group:		
Long Island Water Co.	Queens and Nassau Counties, N. Y.	April
Patchogue Electric Light Co.	Southern Long Island, N. Y.	April
Manila Electric Co.	Manila and environs, P. I.	April
Portsmouth Power Group	Portsmouth, etc., N. H., and Kittery and Eliot, Maine.	April
Clinton Light & Water Co.	Clinton, Ky.	*July
Meyersdale Electric Light, Heat & Power Co.		
Citizens' Light, Heat & Power Co.	Meyersdale, Garrett, Salisbury and Elk Lick, Pa. and Grantsville, Md.	*Oct.
Garrett Elec. Light, Heat & Pwr. Co.		
Summit Township Electric Light, Heat & Power Co.		
New York State Gas & Electric Corp. (Ithaca, N. Y.):		
Berholme Power Co., Inc.	Holmesville, N. Y.	Dec.
Brookfield Elec. Light & Power Co. (generating plant and equipment excepted)	Brookfield, N. Y.	*May
Coan, Charles	Korbright, N. Y.	*July
Deansboro Electric Light Plant	Deansboro, N. Y.	*May
Delancey Electric Light Co., Inc. (electric distribution system only)	Hamden, N. Y.	*July
Earlville Electric Light Co.	Earlville, N. Y.	Dec.
Hamden Electric Light Co.	Hamden, N. Y.	*July
Hotchkin Malcolm G. (electric distribution system only)	Andes, N. Y.	*July
Livingston Manor Electric Corp.	Livingston Manor, N. Y.	Dec.
Roxbury Light & Power Co., Inc.	Roxbury, N. Y.	Dec.
Seely Electric Co.	Spencer, N. Y.	Dec.
Smyrna Electric Light Co.	Sherburne, N. Y.	Dec.
West Burlington Electric Plant	West Burlington, N. Y.	*May
Windham Valley Electric Co.	Windham, N. Y.	Dec.
Plattsburgh Gas & Electric Co. (N. Y.):		
Champlain Electric Co.	Champlain, N. Y.	*Aug.
Chasm Power Co.	Chateaugay, N. Y.	*Aug.
White, Norman I. (Plant)	Ellenburg, N. Y.	*Aug.
United Light, Heat & Power Co.	Stoyestown, Pa.	*Oct.
Wayside Electric Co.	Quemahoning, Shade, Stoneycreek and Shanksville, Pa.	*Oct.
White Oak Light, Heat & Power Co.	Hollsopple, Pa.	*July
Athens Municipal Plant (Ala):		
Lakeland Municipal Plant	Lakeland, Fla.	*July
Atlantic Public Utilities, Inc.		
Caribou Water, Lt. & Pwr. Co. (Maine):		
New Sweden Lt. & Pwr. Co.	Maine.	July
Edisto Public Service Co.	14 communities in So. Car.	Mar.
Electric properties in	Fairfax and Varnville, S. C.	Aug.
Municipal Elec. Light Plant	Branchville, S. C.	*Oct.
Ohio Northern Pub. Serv. Co.	Bowling Green, Ohio.	Mar.
Provincetown Lt. & Pwr. Co.	Mass.	Mar.
Avon River Power Co. (Windsor, N. S.)		
Eastern and middle portion of Annapolis Valley in Nova Scotia:		
Gaspereaux River Lt., Heat & Pwr. Co.	Wolfville, N. S.	*July
Windsor Electric Light & Power Co.	Windsor, N. S.	*May
Balch (A. C.), Kerchoff (W. G.) and Meyer (Ben. R.):		
Hanford Gas & Power Co.	Hanford, Calif.	*Jan.
Bangor Hydro-Electric Co. (Bangor, Maine):		
Cherryfield Electric Light Co.	Cherryfield, Maine.	July
International Paper Co.	Water power rights, dam, etc., pertaining to hydro-electric development at West Enfield, Maine.	Aug.
Sorrento Electric Light Plant	Sorrento, Maine.	Aug.
Benton County Utilities Corp. (Charles Page, Sand Springs, Okla.):		
Electric Property	Decatur, Ark.	*Jan.
Municipal Plants	Gravette, Sulphur Springs and Siloam Springs, Ark.	*Jan.
Willmer & Co., F. E.	Gentry, Ark.	*Jan.
British Columbia Electric Railway Co.:		
British Columbia Electric Power & Gas Co.		
Bridge River Power Co.		
British Columbia Gas Co.		
British Columbia Rapid Transit Co.		
Burrard Power Co.	Canada	*Mar.
Vancouver Gas Co.		
Vancouver Island Power Co.		
Vancouver Power Co.		
Victoria Gas Co.		
Western Power Co.		
Buffalo, Niagara & Eastern Power Corp.:		
Bradford Electric Co. (Bradford, Pa.):		
Municipal Electric Plant	Port Allegany, Pa.	*Oct.
Niagara, Lockport & Ontario Power Co. (Buffalo, N. Y.):		
Ottman, William J.	Portions of Towns of Verona and Vienna, N. Y.	*May
Tonawanda Power Co. (North Tonawanda, N. Y.):		
Grand Island Light & Power Corp.	Grand Island, N. Y.	*Jan.

*Date reported in ELECTRICAL WORLD.

Companies Involved	Territory Served	Date of Merger
Canada Northern Power Corp:		
Porcupine Telephone & Power Co.:		
Northern Ontario Light & Pwr. Co.	Timmins, Ont, only	*April
Canadea Power Corp. (Subsidiary of Mohawk Valley Co.):		
Genesee Valley Power Co.	Fillmore, N. Y.	*Mar.
Canada International Paper Co. (International Paper Co., New York):		
Hull Elec. Co. (Canadian Pacific R.R.)	Hull, Quebec	*May
Hull Elec. Ry. Co.(Can. Pacific R.R.)	Hull, Quebec	*May
Carolina Power & Light Co. (Subsidiary of National Power & Light Co.; under supervision of Electric Bond & Share Co.):		
Asheville Power & Light Co.	Asheville, N. C.	*April
Carolina Power Co.	Raleigh, N. C.	*April
Carolina Power & Light Co.	Raleigh, N. C.	*April
Laurinburg Light & Power Co.	Laurinburg, N. C.	Sept.
Madison Light & Power Co.	Marshall, N. C.	May
Municipal Lighting Plant	Littleton, N. C.	*Aug.
Pigeon River Power Co.	Raleigh, N. C.	*April
North Carolina Electrical Pwr. Co.	Western North Carolina	*Mar.
Canton Electric Co.	Western North Carolina	*Mar.
Warrenton Elec. Lt. Co. (Municipal)	Warrenton, N. C.	*Aug.
	Sumter, S. C.	*Nov.
Yadkin River Power Co.	Raleigh, N. C.	*April
Carolina Electric Co.	Maxton, N. C.	May
Central Hudson Gas & Electric Co. (Poughkeepsie, N. Y.):		
Citizens' Railroad, Light & Pwr. Co.	Beacon, N. Y.	*Jan.
Fishkill Electric Railway Co.	Beacon, N. Y.	*Jan.
Southern Dutchess Gas & Elec. Co.	Beacon, N. Y.	*Jan.
Stissing Light & Power Co., Inc.	Pine Plains, N. Y.	Aug.
Wappingers Electric Corp.	Wappingers Falls, N. Y.	*Jan.
Central Illinois Public Service Co. (Springfield, Ill.) (Subsidiary of Middle West Utilities):		
Alvn Grain & Electric Co.	Alvin, Bismarck, Armstrong, Potomac, Henning and Illiana, Ill.	Jan.
Anchor Electric Light Co.	Anchor, Ill.	*Nov.
Cambria Light, Heat & Power Co.	Cambria, Ill.	*April
Electric Properties	Coatsburg, Farina and Littleton, Ill.	*July
	Paloma, Ill.	*Oct.
Liberty Electric Co.	Liberty, Ill.	*Oct.
Lorsine Electric Light & Power Co.	Loraine, Ill.	Aug.
Mendon Electric Light & Power Co.	Mendon, Ill.	*Oct.
Middletown Light & Power Co.	Middletown, Ill.	*July
Municipal Electric Systems	Belleflower, Fisher & Sibley, Ill.	*Jan.
	Divernon, Ill.	*Mar.
	Brookport, Ill.	*April
	Creal Springs and Kinmundy, Ill.	*July
New Holland Light & Power Co.	New Holland, Ill.	*May
Rossville Electric Light Co.	Rossville, Ill.	June
Sadorns Light & Power Co.	Sadorns, Ill.	Aug.
Central Iowa Power & Light Co. (Waterloo, Iowa):		
(Subsidiary of American Gas Co.)		
Municipal Light & Power Plant	Pioneer, Iowa	*Aug.
Central Power & Light Co. (Subsidiary of Middle West Utilities Co., through Central & South West Utilities Co.):		
Municipal Electric Light & Pwr. Plant.	Wellington, Texas	*Sept.
Texas Central Power Co.	San Antonio, Texas	*Aug.
Cotulla Light & Ice Co.	Cotulla, Texas	*Mar.
Goliad Supply Co.	Goliad, Texas	*Mar.
Hebronville Elec. Light & Pwr. Plant	Hebronville, Texas	*Mar.
Pagel Electric & Ice Co.	Schulenburg, Texas	*Mar.
Sabinal Utilities Co.	Sabinal, Texas	*Mar.
Three Rivers Elec. Light & Pwr. Plant.	Three Rivers, Texas	*Mar.
Central Public Service Co. (A. E. Pierce, Chicago, Ill.):		
Central Gas & Electric Co.:		
Central States Gas Co.		April
Consolidated Water Co. of Surburban New York		April
Hoosier Public Utility Co. (Greensbury, Ind.):		
Central States Gas Co.	Vincennes, Ind.	April
Greensburg Gas & Electric Co.	Greensburg, Ind.	*Jan.
Princeton Utilities Co.	Princeton, Ind.	April
Houghton County Electric Light Co.	Houghton, Mich.	April
Houghton County Traction Co.	Houghton, Mich.	April
Illinois Public Utility Co.:		
Albion Electric Light & Gas Co.	Albion, Ill.	*Feb.
Atlanta Electric Light & Pwr. Co.	Atlanta, Ill.	*Jan.
Atwood Electric Light & Pwr. Co.	Atwood, Ill.	*Feb.
Belleflower Light & Power Co.	Belleflower, Ill.	*Feb.
Bement Electric Light & Pwr. Co.	Bement, Ill.	*Feb.
Freeport Gas Co.	Freeport, Ill.	*Feb.
Homer Elec. Light & Power Co.	Homer, Ill.	*Feb.
Lincoln Water & Light Co.	Lincoln, Ill.	*Feb.
Hullinger Light & Power Co.	San Jose, Ill.	*Mar.
Philo Light, Heat & Pwr. Co.	Philo, Ill.	*Mar.
Mt. Pulaski Elec Light, Heat & Power Co.	Mt. Pulaski, Ill.	*Feb.
Royal Light & Power Co.	Delavan, Ill.	April
Lower Peninsula Power Co. (Frankfort, Mich.):		
Benzie County Power Co.	Frankfort, Mich.	April
Eesley Light & Power Co.	Plainwell, Mich.	April
M. & W. Light & Power Co.	Wayland, Mich.	April
Maine Public Utility Co.:		
Carleton Electric Co.	Woodstock, N. B., Canada	Feb.
Easton Electric Co.	Easton, Maine	Feb.
Fort Kent Electric Co.	Fort Kent, Maine	Feb.
Gould Electric Co.	Presque Isle, Maine	Feb.
Katahdin Electric Co.	Patten, Maine	Aug.
Maine & New Brunswick Electric Power Co., Ltd.	Presque Isle, Maine	Feb.
Woodstock Electric Railway Light & Power Co.	Woodstock, N. B., Canada	Feb.
Wisconsin Public Utility Co.:		
West Bend Heating & Ltg. Co.	West Bend, Wis.	Feb.
Central Public Utility Co.:		
Michigan Water Power Co.	Two hydro-electric developments on Thorneapple River at Ada and Cascade	April
Southern Gas & Power Co.	Lexington, Ky.	*Dec.
Central States Electric Co. (Cedar Rapids, Iowa.):		
Alpha Electric Plant	Alpha, Minn.	*Sept.
Municipal Electric Distribution Sys.	Kanawha, Iowa	*Oct.
	Laurens, Iowa	*Dec.
Municipal Electric Light Plant	Homer, Nebr.	*Nov.
	Walthill, Nebr.	*June
Central States Power & Light Corp. (Davenport, Iowa.):		
Arkansas Public Service Co.	Blytheville, Ark.	*Jan.
Berryville Mining Co.	Berryville, Ark.	Sept.
Green Forest Milling & Elevator Co.	Green Forest, Ark.	Sept.
Central Light & Power Co.	11 communities in N. D	*Sept.
Fessenden Light & Power System	Fessenden, N. D.	Mar.
Hawkeye State Power Co.	Davenport, Iowa	Jan.
Lone Star State Power Co.	Floresville, Texas	Jan.
Missouri Electric Power Co.	Marshfield, Mo.	*Jan.
Missouri Power Development Co.	Willow Springs, Mo.	*Jan.
Puxico Light & Water Co.	Puxico, Mo.	*Feb.
Nebraska Electric Power Co.	22 communities in Nebr.	*Sept.
Municipal Light & Water Plant	Gordon, Nebr.	Nov.
Sheridan Electric Service Co.	Rushville, Nebr.	Jan.
Northeastern Iowa Power Co.	75 communities in Iowa	*Sept.
Municipal Plant & Distribution Syst.	Bassett, Iowa	*Dec.
Southeast Missouri Public Service Co.	Mo.	*Jan.
Central Wisconsin Power Co. (Madison):		
(Subsidiary of Middle West Utilities Co., through North West Utilities Co.)		
Caroline Electric Co.	Caroline, Wis.	*July
Marion Light & Power Co.	Marion, Wis.	*Jan.
Wall-Spalding Co. (Waterpower properties)	Big Falls, Wis.	*Jan.
Chickasha Gas & Electric Co. (Okla.) (Subsidiary of Middle West Utilities Co. through Central & South West Utilities Co.):		
Sloan Electric Plant, J. B.	Tuttle, Okla.	April
Cities Service Co. (Henry L. Doherty interests):		
Bluff City Electric Light & Power Co.	Bluff City, Tenn.	*Nov.
DeKalb Power & Light Co.	DeKalb, Mo.	*Dec.
Electric Utilities Co. (Mo.):		
Electric Service Co.	Noel, Anderson, Pineville,	
Neel Mill & Power Co.	etc., Mo.	*July
Indiana River Power Co.	Lanagan and Goodman, Mo.	*June
Empire District Electric Co. (Joplin, Mo.):		
Municipal Light & Power Plant	Seneca, Mo.	*July
Ohio Public Service Co. (Cleveland, Ohio):		
Electric Light & Power System	Sheffield Lake Village, Ohio	Oct.
Public Service Co. of Colorado (Denver, Colo.):		
Brighton Ice, Light & Power Co.	Brighton, Colo.	*Feb.
Grand Junction Gas & Electric Co.	Grand Junction, Colo.	*Mar.
Grand Junction Ice Plant	Grand Junction, Colo.	*Mar.
Grand River Valley Railway	Grand Junction, Colo.	*Mar.
Municipal Lighting Plant	Bruso, Colo.	*April
Municipal Electric Plant	Sedgwick, Colo.	*Dec.
Palisades Light Co.	Palisades, Colo.	*Mar.
Rifle Light, Heat & Power Co.	Rifle, Colo.	*May
Suburban Light & Power Co.	Aurora, Colo.	*Jan.
St. Joseph Railway, Lignt, Heat & Power Co. (St. Joseph, Mo.)		
Rushville Electric Light & Power Co	Suburbs of St. Joseph, Mo.	*April
Municipal Plant	Easton, Mo.	*Dec.
Taney Light & Water Co.	Branson, Mo.	*May
Toledo Edison Co. (Toledo, Ohio):		
Beverly Service Co.	Toledo, Ohio.	Sept.
Lake Shore Power Co.	Toledo, Ohio.	*Sept.
Citizens' Heat, Light & Power Co. (Winchester, Ind.):		
Jantha Light & Fuel Co.	Greenville, Ohio.	*Jan.
Clay, C. M. (Simpson, Thacher & Bartlett, New York):		
Helena Light & Railway Co.	Helena, Mont.	*Dec.
Cleveland Electric Illuminating Co. (Ohio) (Subsidiary of North American Co.):		
Cleveland, Painesville & Eastern Railroad Co. (Electric Light and Power properties)	Ohio.	*Jan.
United Light & Power Co.	Geneva, Ohio.	*Jan.
Grand River Electric Lt. & Pwr. Co.	Rock Creek, Eagleville, Austinburg and territory along main east and west highways bet. Ashtabula and Geneva.	*April
Municipal Light Plant	Chadron, Ohio.	*Jan.
Municipal Power & Light Plant	Conneaut, Ohio.	*Jan.
Northeastern Ohio Power & Lt. Co.	Kingsville & North Kingsville and section of main highway bet. Ashtabula and Conneaut	*April
Suburban Utilities Co.	Geneva-on-the-Lake and other lake shore communities bet. Geneva-on-the-Lake and Ashtabula	*April
Colorado Utilities Corp. (Troy, Graham & Co., Chicago):		
Craig Light & Power Co.	Craig, Colo.	*Mar.
Hayden Milling & Power Co.	Hayden, Colo.	*Mar.
Oak Creek Service Co.	Oak Creek, Colo.	*Mar.
Steamboat Service Co.	Steamboat Springs, Colo.	*Mar.
Columbia Gas & Electric Corp. (W. Va.):		
Columbia Gas & Electric Co.	Virginia, Kentucky and Ohio.	*July
Ohio Fuel Corp.	Pittsburgh, Pa.	*July
Columbus, Delaware & Marion Electric Co.:		
Ashley Light, Heat & Power Co.	Ashley, Ohio.	*July
(Sold to Morrow Public Service Co., Cardington, Ohio).		
Richwood Light, Heat & Power Co.	Richwood, Ohio.	*Aug.
Columbus Railway Power & Light Co.:		
(Subsidiary of United Light & Power Co., through Continental Gas & Electric Corp., a subsidiary of United Light & Railways Co.)		
Centerburg Electric Co.	Centerburg, Ohio.	*July
Mount Sterling Municipal Plant.	Ohio.	*Jan.
Commonwealth Power Corp.:		
see also Consumers Power Co.		
Ohio Edison Co. (Springfield, Ohio):		
Belle Center Light & Power Co.	Belle Center, Ohio.	June
Southern Indiana Gas & Electric Co. (Evansville, Ind.):		
Fort Branch Electric Light Co.	Fort Branch, Ind.	*Jan.
Southern Michigan Light & Power Co. (Hudson, Mich.)		
Community Power Co.	Carson City, Mich.	Sept.
Lake Shore Electric System	Douglas, Saugatuck and Shorewood, Mich.	July
Ravenna-Conklin-Marne Power Co.	Ravenna, Conklin, Marne and Eastmanville, Mich.	*Sept.
Tennessee Electric Power Co. (Chattanooga, Tenn.):		
Murfreesboro Light & Power Co.	Murfreesboro, Tenn.	*Mar.

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Companies Involved	Territory Served	Date of Merger
Commonwealth Utilities Corp. (Wiley F. Corl, St. Louis, Mo.):		
Louisiana Ice & Utilities, Inc:		
Electric Light & Power Plants	Bunkie, Colfax and Lutcher, La.	Jan.
Municipal Elec. Light & Water Plant	Mansura, La.	Sept.
Small properties in	Mississippi	*Feb.
Connecticut Light & Power Co. (Subsidiary of Connecticut Electric Service Co.):		
Meriden Electric Light Co.	Meriden, Conn.	*Mar.
Meriden Gas Light Co.	Meriden, Conn.	*Mar.
New Milford Electric Light Co.	New Milford, Conn.	*Mar.
Westport Electric Co.	Westport, Conn	*Mar.
Woodbury Electric Co.	Woodbury, Conn.	*Mar.
Consolidated Gas, Electric Light & Power Co. of Baltimore:		
Freedom District Electric Light Co.	Near Eldersburg, south of Westminster, Md.	*Jan.
Pennsylvania Water & Power Co.:		
(10,000 shares of stock, par $100)	Holtwood, Pa.	*Jan.
Consolidated Water Power Co. (Wisconsin Rapids, Wis.) (Subsidiary of Consolidated Water Power & Paper Co.		
(water power developments in)	Biron and Wisconsin Rapids, Wis.	*May
Oneida Power Co.	Wisconsin Rapids.	*June
Consumers Power Co. (Jackson, Mich.) (Subsidiary of Commonwealth Power Corp.):		
Gregory Electric Light Plant	Gregory, Mich.	Sept.
Ionia Water Power & Electric Co.	Ionia, Mich.	Mar.
Municipal Lighting Plant	Reed City, Mich.	*Mar.
Municipal Power Plant	Frankenmuth, Mich.	*Sept.
Rouge River Electric Light & Pwr. Co.	Rockford, Mich.	Sept.
Southern Michigan Lt. & Power Co.	Hudson, Mich.	Sept.
Continental Light & Power Co.:		
Municipal Electric Light Plant	St. Jo, Texas.	*Mar.
Day & Zimmermann, Inc. (Philadelphia, Pa.):		
General Public Utilities Co.:		
Consolidated Power & Light Co.	Deadwood, S. Dak.	*May
Dakota Power Co.	Rapid City, S. Dak.	*May
Gothenburg Light & Power Co.	Gothenburg, Neb	*May
Gulf Public Service Co.	Louisiana.	*May
Municipal Lighting Plant	Alamogordo, N. Mex.	*Sept.
Nebraska Light & Power Co.	McCook, Neb.	*May
Southwestern Public Service Co.	N. Mex.; Ariz. and Tex.	*May
Municipal Elec. Light & Ice Plant	McLean, Texas.	*Dec.
Derby Gas & Electric Corp. (Subsidiary of Utilities Power & Light Corp.		
Derby Gas & Electric Co. / Wallingford Gas Light Co.	Derby, Shelton and Ansonia, Conn.	*Aug.
East Texas Public Service Co. (Marshall) (Subsidiary of Middle West Utilities Co. through American Public Service Co., a subsidiary of Central & South West Utilities Co.):		
Carthage Electric & Ice Co.	Carthage, Texas.	*Aug.
Center Electric & Ice Co.	Center, Texas.	*Aug.
Home Light & Ice Co.	Pittsburg, Texas.	*Feb.
Tenaha Electric & Ice Co.	Tenaha, Texas.	*Aug.
Eastern New Jersey Power Co. (Asbury Park, N. J.) (Subsidiary of Utilities Power & Light Corp.):		
Browns Mills Elec. Light & Pwr Co.	Browns Mills, N. J.	*June
New Egypt Lt., Heat, Pwr. & Water Co.	New Egypt, N. J.	*June
Eastern Utilities Corp. (Chicago, Ill.):		
Municipal Plant	Urbanna, Va.	*Sept.
People's Light, Heat & Power Corp.	Westpoint, Va.	*Sept.
Electric Bond & Share Co.:		
See also Arkansas Power & Light Co. Carolina Power & Light Co., Florida Power & Light Co., Houston Light & Power Co., Idaho Power Co., Kansas Gas & Electric Co., Lehigh Power Securities Co., Louisiana Power & Light Co.		
American & Foreign Power Co.:		
Havana Electric & Utilities Co	Havana, Cuba	*July
Havana Electric Railway, Light & Power Co. (Havana, Cuba):		
Cuban Utilities Co.	Santiago and Camaguey, Cuba	*Aug.
Havana Electric Railway, Light & Power Co	Havana, Cuba	*Aug.
Mississippi Power & Light Co. (Jackson) (Subsidiary of Electric Power & Light Corp.):		
Home Light & Power Co.:		
Municipal Plant	Yazoo, Miss.	*Jan.
Panola Electric Light & Power Co	Sardis, Miss.	*July
Planter's Oil Mills (Lighting & Ice Making Plant)	Tunica, Miss.	*Jan.
Sunflower Light, Ice & Power Co.	Indianola, Miss.	Sept.
Pacific Power & Light Co. (Portland, Ore.) (Subsidiary of American Power & Light Co.):		
Inland Power & Light Co.:		
Deschutes Power Co	Prineville, Ore.	*Jan.
Bend Water, Light & Power Co.	Bend, Ore.	Jan.
Deschutes Power Co.	Prineville, Ore.	Jan.
Enterprise Electric Co.	Enterprise, Ore.	*Jan.
Grangeville Elec. Light & Power Co.	Grangeville, Idaho.	*Jan.
Pennsylvania Power & Light Co. (Allentown, Pa.) (Subsidiary of Lehigh Power Securities Corp.):		
Duryea Borough-Luzerne Power & Light Co. / Exeter-Luzerne Power & Light Co.	Pennsylvania	May
Lehighton Electric Light & Power Co	Lehighton, Pa.	*June
Palmerton Lighton Co.	Palmerton, Pa.	July
Panther Valley Electric Co.	Lansford, Pa.	*June
Pittston-Luzerne Power & Light Co.	Pennsylvania.	May
White Haven Light, Heat & Pwr. Co. / Dennison Electric Co.	White Haven, East White Haven and Tannery, Pa.	*Aug.
Texas Power & Light Co. (Subsidiary of American Power & Light Co., through Southwestern Power & Light Co.):		
Cameron Water, Power & Light Co.	Cameron, Tex.	*Jan.
Llano Electric Light & Power Plant (Llano Milling & Mfg. Co.)	Llano, Texas.	*April
Municipal Light & Power Dept	Nacogdoches, Texas.	*Mar.
Municipal Light, Water & Ice Plant	Canton, Texas.	*Dec.
Texas Public Utilities Co. (Dallas, Texas) (Subsidiary of American Power & Light Co., through Southwestern Power & Light Co.):		
Ashcroft & Sons (B. F.), Electric Light & Power Plant	Sulphur Springs, Texas.	*Jan.
Bellville Cotton Oil Co.	Bellville, Texas.	April
San Marcos Utilities Co.	San Marcos, Texas.	April
Utah Power & Light Co. (Salt Lake City) (Subsidiary of Electric Power & Light Corp.):		
Green River Electric Light & Power Co.	Green River, Wyo.	Sept.
Moab Power & Light Co.	Moab, Utah.	*Oct.
Municipal Electric Light & Power Plant	Green River, Utah.	*Aug.
Western Colorado Power Co.:		
Telluride Power Co. (Colo. Dept.)	Salt Lake City, Utah.	Sept.
Electric Co. of New Jersey (Bridgeton, N. J.): (Subsidiary of American Gas & Electric Co.)		
Harrison Heights Improvement Co.	Mullica Hill, N. J.	Sept
Electric Public Service Co.:		
Colorado Central Power Co.	16 communities near Denver, Colo.	*Dec.
Arapahoe Electric Light & Power Co.	Englewood, Colo	*Dec.
Jefferson County Power & Light Co.	Golden, Colo.	*Dec.
Oklahoma Utilities Co. (Fairfax, Okla.):		
Fairfax Elec. Lt., Ht. & Pwr. Plant	Fairfax, Okla.	*Jan.
Hominy, Ice., Light & Power Co.	Hominy, Okla.	July
Ralston Lt., Pwr. & Water Works.	Ralston, Okla.	Aug.
Toledo, Bowling Green & Southern Traction Co.	Finlay, Ohio.	Sept.
Empire Pwr. Corp. (E.L. Phillips Interests):		
Empire Gas & Electric Co.	Geneva, N. Y.	*Feb.
Long Island Lighting Co.	New York, N.Y.	*Feb
New York Central Electric Corp.	Perry, N. Y.	*Feb.
Hammondsport Electric Light Co.	Hammondsport, N. Y.	*Feb.
Municipal Electric Plant	Savona, N. Y.	*April
Richmond Light, Heat & Power Co.	Richmond, Ind.	*Mar.
United Gas & Electric Corp	New York, N. Y.	*Jan.
Engineers Public Service Co. (New York, N.Y.): (Under executive management of Stone & Webster, Inc.)		
Baton Rouge Electric Co.	Baton Rouge, La.	*May
Eastern Texas Electric Co.		*Jan.
Gulf States Utilities Co (Lake Charles, La.):		
Light & Power properties of Eastern Texas Electric Electric Co.	Beaumont, Texas.	Nov.
Municipal Light Plant	Lake Arthur, La.	Sept.
El Paso Electric Co.	El Paso, Texas.	*Mar.
Key West Electric Co.	Key West, Fla.	*Mar.
Savanah Electric & Power Co.	Savannah, Ga.	*Mar.
Virginia Elec. & Pwr. Co. (Richmond, Va.):		
Bowling Green Light & Power Co.	Bowling Green, Va.	Aug.
Municipal Plant	Tappahannock, Va.	*Jan.
Smithfield Power Co.	Smithfield, Va.	April
Fayette Utilities Co. (Oak Hill, W. Va.):		
Fayette Public Service Co.	Fayetteville, W. Va.	Sept.
Florida Power & Light Co. (Miami, Fla.) (Subsidiary of American Power & Light Co.; under supervision of Electric Bond & Share Co.):		
Brevard County Power Co.	Cocoa, Fla.	May
Daytona Public Service Co.	Daytona, Fla.	*Jan.
Hollywood Elec. Lt. & Water Dept.	Hollywood, Fla.	Aug.
Miami Beach Electric Co.	Miami Beach, Fla.	*Jan.
Miami Electric Light & Power Co.	Miami, Fla.	*Jan.
Ormond Supply Co.	Ormond, Fla.	*Jan.
St. John's Electric Co.	St. Augustine, Fla.	*Jan.
Southern Utilities Co.	Palatka, Fla.	*Jan.
Municipal Distribution Systems	Coral Gables, Fla.	*April
	Punta Gorda, Fla	Nov.
Municipal Electric Plants	Delray and Florida City, Fla.	*Oct.
Municipal Light Plant	Punnell, Fla.	*Aug.
Municipal Plant	Sarasota, Fla.	*Jan.
Foshay Co., W. B. (Minneapolis, Minn.):		
Peoples Light & Power Corp.:		
Peoples Arizona Gas & Electric Co.:		
Globe Electric Light & Gas Co.	Globe, Ariz.	*Sept.
Peoples California Hydro-Electric Corp.:		
Alturas Electric Power Co.	Alturas, Cal.	*Oct.
Fort Bragg Electric Co.	Fort Bragg, Cal.	*Aug.
Mendocino Light & Power Co.	Mendocino, Cal.	*Oct.
Peoples Hydro-Electric Vermont Corp.:		
Montpelier & Barre Lt. & Pwr. Co.	Montpelier, Vt.	*Oct.†
Green Mountain Power Co.	Montpelier, Vt.	*Oct.†
Vergennes Electric Co.	Vergennes, Vt.	*Aug.
Peoples Iowa City Water Works Corp.:		
Iowa City Water Works Co.	Iowa City, Iowa.	Sept.
Peoples Minnesota Gas & Electric Corp.:		
Bemidji Gas Co.	Minn.	Sept.
Crookston Gas Co.	Minn.	Sept.
Henderson Light & Power Co.	Henderson, Minn.	July
Waconia Light & Power Co	Waconia, Minn.	July
Peoples West Coast Hydro-Electric Corp. (Newport, Ore.):		
West Coast Power Co.:		
Adams County Lt. & Pr Co.	Cambridge, Idaho	*Nov.
Burns Power & Light Co.	Burns, Ore.	Oct.
Clatskania Power & Light Co.	Clatskanie, Ore.	Oct.
Florence Electric Co.	Florence, Ore.	Oct.
General Light & Power Corp.	Shelton, Wash.	Oct.
Ilwaco Light & Power Co.	Ilwaco, Wash.	Oct.
Shorley Light & Power Co.	Reedsport, Ore.	Oct.
Skamania Light & Power Co.	Stevenson, Wash.	Oct.
Waldport Light Co.	Waldport, Ore.	Oct.
Willapa Power Co.	South Bend, Wash	Oct.
Wood River Power Co.	Hailey, Idaho.	*Nov.
Peoples Wisconsin Hydro-Electric Corp.:		
Municipal Water Supply	Hurley, Wis.	*May
Municipal Power Corp.	Wis.	*May
New Richmond Power Co.	New Richmond, Wis.	*Nov.
Wisconsin Hydro-Electric Co.	Amery, Wis.	May
Midland Power Co.	Northwestern Minnesota	*May
Viborg Electric Service Co.	Viborg, S. Dak.	*May
Fulton County Gas & Elec. Co. (Gloversville, N. Y.) (Subsidiary of Mohawk Hudson Power Corp.):		
Broadalbin Elec. Lt. & Pwr. Co.	Broadalbin, N. Y.	*Oct.
Gage County Elec. Co. (Beatrice, Nebr.):		
Black Brothers (Light & Power Service)	Beatrice, Nebr.	*May
Galveston Electric Co. (Galveston, Tex.) (Under executive management of Stone & Webster, Inc.):		
Brush Electric Co.	Galveston, Tex.	March

*Date reported in ELECTRICAL WORLD. † To become effective January 15, 1927.

Companies Involved	Territory Served	Date of Merger
Gary Heat, Light & Water Co. (Ind.):		
Municipal Electric Lighting Systems	Gary, Ind.	*Dec.
General Engineering & Management Corp.: See also Inland Power & Light Co.		
Fitkin Utilities, Inc.:		
Campbell Electric Lt. & Power Co.	Campbell, Mo.	*May
City Operating Co.	Jasper, Fla.	*Nov.
James (R. L.), Electric Light Plant	Steele, Mo.	*May
Florida Power Corp.:		
Central Florida Power Co.		*Dec.
Pinellas County Power Co.	St. Petersburg, Fla.	*Dec.
West Florida Power Co.	Tallahassee, Fla.	*Dec.
Georgia-Florida Power Co.:		
Bainbridge Power Co.	Southwestern Ga., in vicinity of Brainbridge, Ga.	*May
Municipal Electric Light Plant	Colquitt, Ga.	Mar.
Seminole Power Co.	Southwestern, Ga., in vicinity of Brainbridge, Ga.	Mar.
Jersey Central Power & Light Co.:		
New Jersey Gas & Electric Co.:		
Municipal Plants	Atlantic Highlands and Barnegat, N. J.	*June
National Public Service Corp.:		
Tide Water Power Co. (Wilmington, N. C.):		
Duplin Light & Power Co.	Wallace, N. C.	Sept.
Virginia Public Service Corp.	Charlottesville, Va.	*April
Alexandria Light & Power Co.	Alexandria, Va.	*April
Appomattox Light & Power Co.	Appomattox, Va.	Aug.
Charlottesville & Albemarle Ry. Co.	Va.	*July
Newport News & Hampton Railway, Gas & Electric Co.	Va.	*Jan.
South Side Virginia Power Co.	South Boston, Va.	*Mar.
Luray Power Co.	Luray, Va.	*Feb.
Virginia Northern Power Co.	Warrenton, Va.	*April
Virginia Western Power Co.	Clifton Forge, Va.	*April
Western United Corp:		
Aurora, Elgin, Fox River Elec. Co.	Elgin, Ill.	*Feb.
Southern Illinois Gas Co.	Murphysboro, Ill.	*Feb.
Western United Gas & Electric Co.	Aurora, Ill.	*Feb.
Fox River Power Co.		Nov.
General Gas & Electric Corp. (Del.):		
Broad River Power Co. (Columbia, S. C.):		
Enoree Power Co.	Wellford, S. C.	*July
Florida Public Service Co. (Orlando, Fla.):		
Municipal Power Plant	Umatilla, Fla.	*Aug.
General Finance Corp.:		
Annville & Palmyra Elec. Light Co.	Lebanon County, Pa.	*Mar.
Berks-Lehigh Electric Co.	Berks and Lehigh Counties, Pa.	July
Bernville Light, Heat & Power Co.	Bernville, Pa.	July
Boyertown Electric Co.	Boyertown, Pa.	*Mar.
French Creek Electric Co.	W. Va.	June
Melrose Power & Mfg. Co.	Pa.	Oct.
Orrtanna Electric Light & Pwr. Co.	Orrtanna, Pa.	*Feb.
Weisenberg Township Electric Light & Power Co.	Weisenburg, Pa.	Feb.
Manufacturers' Power Co.	Spartanburg, S. C.	*May
Blue Ridge Power Co.	Hendersonville, N. C.	*May
Metropolitan Edison Co. (Reading, Pa.):		
Blue Mountain Electric Co.	Berkes & Lebanon Counties, Pa.	*Nov.
Cumberland Valley Lt. & Pwr. Co Gettysburg Electric Co. Hanover Power Co.	Adams, Cumberland and York Counties, Pa.	*Mar.
Maryland Public Service Co.	Silver Run & Union Mills, Md.	Oct.
York Haven Water & Power Co.	York Haven, Pa.	*Dec.
New Jersey Power & Light Co. (Dover, N. J.):		
Community Light & Power Co.	Quakertown, N. J.	*Oct.
Hunterdon Electric & Power Co.	High Bridge, N. J.	April
Jersey Electric Co.	High Bridge, N. J.	April
Northern Pennsylvania Power Co. (Towanda, Pa.):		
North Penn Power Co.	Blossburg, Pa.	*April
Sayre Electric Co.	Sayre, Pa.	*April
Susquehanna County Lt. & Pwr. Co.	Susquehanna, Pa.	*April
Towanda Gas & Electric Co.	Towanda, Pa.	*April
General Power & Light Co.:		
Arizona Edison Co.	Douglas, Ariz.	Jan.
Northern Michigan Public Service Co.	Traverse City, Mich.	Jan.
Southern Edison Co. (Douglas, Ariz.):		
Arizona Edison Co.	Douglas, Ariz.	June
Bisbee Improvement Co.	Bisbee, Ariz.	June
Douglas Gas Co.	Douglas, Ariz.	June
Douglas Improvement Co. (Ice Dept.)	Douglas, Ariz.	June
Douglas Traction & Light Co.	Douglas, Ariz.	June
Yuma Light, Gas & Water Co.	Yuma, Ariz.	June
Des Arc Light & Ice Co.	Des Arc, Ark.	*July
Florence Improvement Co.	Florence, Ariz.	June
Leslie Electric Light & Power Plant	Leslie, Ark.	*July
Loutre Power Co.	Beebe, Ark.	*July
Stamps Light & Power Co.	Stamps, Ark.	*July
Panola Electric Light & Power Co.	Sardis, Batesville and Como, Miss.	*July
Municipal Light & Water Plant	Senatobia, Miss.	*Dec.
Western States Utilities Co. (Chicago, Ill.):		
Evans Light Co.	Malad City, Idaho	Jan.
Cokeville Light & Power Co.	Cokeville, Wyo.	Jan.
Morgan Electric Light & Power Co.	Morgan, Utah	Jan.
Winnemucca Water & Light Co.	Winnemucca, Nev.	Jan.
Georgia-Carolina Power Co. (Subsidiary of Augusta-Aiken Railway & Electric Corp.):		
Georgia-Carolina Electric Co.:		
Carolina Light & Power Co.	Aiken, S. C.	*June
Georgia Power Co. (Subsidiary of Southeastern Power & Light Co.):		
Athens Railway & Electric Co.	Athens, Ga.	*Sept.
Central Georgia Power Co.	Macon, Ga.	*Sept.
East Georgia Power Co.	Atlanta, Ga.	*Dec.
Georgia Railway & Electric Co.	Ga.	*Sept.
Georgia Railway & Power Co.	Atlanta, Ga.	*Sept.
Georgia Southern Power Co.	Dublin, Ga.	*Sept.
Municipal Electric Light Plant	Baxley, Ga.	*Dec.
Georgia Utilities Co.	Northern Georgia	*Sept.
Macon Railway & Electric Co.	Macon, Ga.	*Sept.
Milledgeville Lighting Co.	Milledgeville, Ga.	*Sept.
Rome Railway & Electric Co.	Rome, Ga.	*Sept.
Georgia Railway & Power Co. (Subsidiary of Southeastern Power & Light Co.):		
Demorest Light & Power Co.	Demorest, Ga.	*April
Distribution System (Private)	Austell, Ga.	*June
Jones Electric Light & Power Plant	Senoia, Ga.	*Sept.
Municipal Distribution Systems	Douglasville, Ga. Greensboro, Ga.	*Jan. *April
Smith Electric Light Plant	McDonough, Ga.	July
Georgia Southern Power Co. (Dublin, Ga.) (Subsidiary of Southeastern Power & Light Co. through Interstate Utilities Corp.):		
Georgia & Southern Utilities	Eastman, Ga.	April
Municipal Electric Light Plant	Wadley, Ga.	*June
Municipal Lighting Plant	Louisville, Ga.	*Feb.
Municipal Light & Water Works	Claxton, Ga.	*June
Municipal Lighting Plant	Midville, Ga.	*June
Municipal Light & Water Plant	Lyons, Ga.	*June
Great Western Power Co. of Calif.: (Subsidiary of North American Co., through Western Power Corp.)		
Napa Valley Electric Co.	St. Helena, Oak Knoll and Rutherford, Calif.	*May
Gretna Light & Power Co. (Gretna, La.):		
Refuge Light & Power Co.	Harvey, La.	Sept.
Harlem Valley Electric Corp. (Pawling, Dutchess County, N. Y.): (Controlled by interests affiliated with Associated Gas & Electric Co.		
Amenia Electric Light & Power Co.	Amenia, N. Y.	*April
Carmel Light & Power Co.	Carmel, N. Y.	*April
Chatham Elec. Lt., Heat & Pwr. Co.	Chatham, N. Y.	*April
Juengst & Sons, George	Croton Falls, N. Y.	*April
Katonah Lighting Co.	Katonah, N. Y.	*April
Lebanon Valley Lighting Co.	Canaan, N. Y.	*April
Morgan & Wyman Elec. Lt. & Pwr. Co.	Dover Plains, N. Y.	*April
Ridgefield Electric Co. (Conn.)	Lewisboro, N. Y.	*April
Haverhill Electric Co. (Haverhill, Mass.): (Subsidiary of Nortn Boston Lighting Properties; under management of Charles H. Tenney & Co.)		
Newburyport Gas & Electric Co.	Newburyport, Mass.	April
Houston Light & Power Co. (Subsidiary of National Power & Light Co.; under supervision of Electric Bond & Share Co.):		
Humble Power & Ice Co.	Humble, Texas	*Nov.
Park Place Water, Light & Power Co. (Light and power properties only)	Houston, Texas	Aug.
Idaho Power Co. (Boise, Idaho), (Subsidiary of Electric Power & Light		
Hughes & Deiters Co.:		
Hughes Electric Co. (Bismarck, N. D.)		
Beulah Electric Light Plant	Beulah, N. D.	Jan.
Gerving Electric Light & Power Co.	Glen Ullin, N. D.	Jan.
Golden Valley Elec. & Pr. Plant	N. D.	Jan.
Hazen Electric Light Plant	Hazen, N. D.	Jan.
Halliday Electric Light Plant	Halliday, N. D.	Jan.
Mandan Electric Co.	Mandan, N. D.	Jan.
Zap Electric Light Plant	Zap, N. D.	Jan.
Corp; under supervision of Electric Bond & Share Co.):		
Salmon River Power & Light Co.	Salmon, Idaho	*Oct.
Illinois Northern Utilities Co. (Dixon, Ill.), (Subsidiary of Middle West Utilities Co.):		
Citizens' Utility Co.	Durand, Davis, Rock City and Dakota, Ill.	*Jan.
Marengo Public Service Co.	Marengo, Huntley and Union, Ill.	*Sept.
Illinois Power & Light Corp. (Subsidiary of North American Light & Power Co., through Illinois Traction Co.):		
Champaign County Electric Co.	Thomasboro, Ill.	Sept.
Kewanee Public Service Co.	Kewanee, Ill.	*Sept.
Le Roy Elec. Lt., Pwr. & Heating Co.	Le Roy, Ill.	*April
Mahomet Light, Heat & Power Co.	Mahomet, Ill.	*April
Mansfield Electric Co.	Mansfield, Ill.	*April
United Power & Light Corp.	Abilene, Kansas	*Feb.
Illinois Public Service Co.:		
Sadorus Light & Power Co.	Sadorus, Ill.	*Nov.
Indiana-Ohio Public Service Co.:		
Union Heat, Light & Power Co.	Union City, Ind.	*June
Inland Power & Light Co. (Under management of General Engineering & Management Corp.):		
Commonwealth Light & Power Co.:		
Interstate Electric Corp.:		*June
Arkansas-Missouri Power Co. (Blytheville, Ark.):		*June
East Missouri Power Co. (Troy, Mo.):		*Sept.
Belleflower El. Lt. & Pwr. Co.	Belleflower, Mo.	*Sept.
Trenton Gas & Electric Co.	Trenton, Mo.	*Sept.
Electric Properties	Bismarck, Irondale and Iron Mountain, Mo. Hawk Point, Old Monroe, St. Peters, Steele, Treuton and Winfield, Mo.	*Nov. *Sept.
Iron County El. Lt. & Pwr. Co.	Arcadia, Mo.	*Nov.
Luxora Water & Light Co.	Luxora, Ark.	Aug.
Missouri Utilities Co.	Poplar Bluff, Mo.	*Nov.
Municipal Systems	Osceola, Ark. Matson, Mo.	Aug. *July
Piedmont Light & Power Co.	Piedmont, Mo.	*Nov.
Potosi Light & Power Co.	Potosi, Mo.	*Nov.
Peoples' Gas & Electric Co.	Chillicothe, Mo.	*June
United Light & Power Co.	Downs, Kans.	*June
Kansas Power Co. (Concordia, Kans.):		*June
Central Kansas Public Service Co.	Ellsworth, Kans.	*Aug.
Dalhart Ice & Electric Co.	Dalhart, Texas	*June
Electric Service Co.	Dodge City, Kans.	*Aug.
Great Bend Water & Electric Co.	Great Bend, Kans.	*Aug.
Hoisington Electric & Ice Co.	Hoisington, Kans.	*Aug.
Liberal Light & Power Co.	Liberal, Kans.	*Aug.
Phillips County Lt. & Power Co.	Phillipsburg, Kans.	*Aug.
Smith Center Light Plant	Smith Center, Kans.	April
Municipal Distribution System & Transmission Line	Haddam, Kans.	*Oct.
Michigan United Light & Power Co. (Ludington, Mich.):		*June
Boyne City Electric Co.	Boyne City, Mich.	*Oct.
Boyne River Power Co.	Boyne City, Mich.	*Oct.
Elk Electric Co.	Elk Rapids, Mich.	*Oct.
Grayling Electric Co.	Grayling, Mich.	*Oct.

*Date reported in ELECTRICAL WORLD.

Companies Involved	Territory Served	Date of Merger
Michigan Public Service Co.	Cheboygan, Mich.	*Oct.
White River Power & Light Co.	Whitehall, Mich.	*Oct.
International Power Co., Ltd.:		
Bolivian Power Co., Ltd.	Bolivia	*Mar.
Demerara Electric Co., Ltd.	British Guiana	*Mar.
Newfoundland Light & Pwr. Co, Ltd.	Newfoundland	*Mar.
San Salvador Electric Lihgt Co.	Salvador, C. A.	*Mar.
Venezuela Power Co., Ltd.	Venezuela	*Mar.
International Utilities Corp.:		
Municipal Elec., Light & Pwr. Plant	Vegreville, Alta.	*May
Nanaimo Light & Power Co.	Nanaimo, B. C., Canada	*April
Interstate Public Service Co. (Indianapolis, Ind.), (Subsidiary of Middle West Utilities Co.):		
French Lick & West Baden Water, Light, Heat & Power Co.	Orange County, Ind.	*May
Municipal Plant	Loogootee, Ind.	*April
Iowa Electric Co. (Cedar Rapids, Iowa):		
Grant Mill Co.	Grant, Iowa	Sept.
Monticello Hydro-Electric Co.	Monticello, Iowa	*Mar.
Municipal Electric Lighting System	McCausland, Iowa	Nov.
Iowa Light, Heat & Power Co. (Subsidiary of Sioux City (Iowa) Gas & Electric Co.; United Gas Improvement Co. is interested in these properties.):		
Lidderdale Electric Lighting Distribution System	Lidderdale, Iowa	*Sept.
Lytton Electric Co.	Lytton, Iowa	Sept.
Municipal Light Plant	Galva, Iowa	Jan.
Iowa Light & Power Co.:		
Marion County Electric Co.	Knoxville, Iowa	*Mar.
Iowa Railway & Light Corp. (Cedar Rapids, Iowa): (Subsidiary of United Light & Power Co.)		
Maxwell Electric Co.	Maxwell, Iowa	Sept.
Modern Light & Power Co.	Atkins, Iowa	*Feb.
Iowa Southern Utilities Co.:		
Municipal Lighting Plant	Eddyville, Iowa	*April
Island Power Co. (New York):		
Patchogue Electric Light Co.	Patchogue, N. Y.	*Mar.
Johnson, Arthur W.:		
Custer Electric Light & Power Co.	Custer, S. D.	*Sept.
Kansas City Power & Light Co. (Subsidiary of Continental Gas & Electric Corp., through Kansas City Power Securities Corp.):		
Municipal System	Edgerton, Kansas	*April
Panhandle Power & Light Co.	Panhandle oil field	Nov.
Kansas Electric Power Co. (Lawrence, Kansas), (Subsidiary of National Electric Power Co.):		
Eastern Kansas Power Co.	Eureka & Greenwood, Kans.	*Aug.
Municipal Electric Light & Power Plant	Madison, Kans.	*Dec.
Ohio Electric Power Co.:		
Miami Valley Electric Co.:		
Union City Electric Co.	Union City, Ohio	
Union City Electric Co.	Union City, Ind.	
Kansas Gas & Electric Co. (Wichita, Kans.), (Subsidiary of American Power & Light Co., under supervision of Electric Bond & Share Co.):		
Municipal Electric Systems	Altoona, Kans.	Nov.
	Burns, Kans.	*Oct.
	Elk City, Kans.	*July
Municipal Light & Power Plants	Cheney, Garden Plain and Goddard, Kans.	*April
Kansas Light & Power Co.		
Oketo Electric Plant	Oketo, Kans.	Sept.
Kentucky-Tennessee Power Co.:		
Municipal Plant (Lease 30-yr.)	Paris, Tenn.	*Jan.
Kentucky Utilities Co. (Louisville, Ky.), (Subsidiary of Middle West Utilities Co.):		
Beaver Dam Milling Co.	Beaver Dam, Ky.	*Oct.
Hiseville Light & Power Co.	Hiseville, Ky.	Sept.
Kentucky Light & Power Co.	Louisville, Ky.	*Mar.
Marion Elec. Lt., Ice & Water Co.	Marion, Ky.	*Feb.
Morton's Gap Electric Light Plant	Morton's Gap, Ky.	Sept.
Municipal Electric Systems	Eddyville, Fredonia, Clarkson and Simpsonville, Ky.	*Oct.
	Harrodsburg and Wickliffe, Ky.	*Dec.
Public Service Co., Inc.	Kuttawa, Ky.	Nov.
West Kentucky Electric Power Co.	Earlington & Sturgis, Ky.	*Sept.
George H. Knutson (Chicago, Ill.):		
Carey Elec. Light & Pwr. Co. (Wis.)	Wilmot, Wis.	*May
Carey Elec. Light & Milling Co. (Ill.)	Wilmot, Wis.	*May
Princeton Water & Light Co.	Princeton, Ind.	*May
La Fayette Power & Light Co.:		
Plank Road Light & Power Co.	Elkhorn, Wis.	*Nov.
Lake Erie Power & Light Co.:		
Lake Shore Electric Railway Co. (Light & Power business only)	Cleveland, Ohio	*April
Bellevue Illuminating & Power Co.	Bellevue, Castalia, Vermillion, Berlin Heights, Avon Lake, Avon and Bay Village Districts	*April
Bellevue Light & Power Co.		
Peoples' Light & Power Co.		
Lake Superior District Power Co. (Ashland, Wis.): (Subsidiary of Middle West Utilities Co., through North West Utilities Co.)		
Athens Electric Light & Power Co.	Athens, Wis.	*Mar.
Glidden Light, Power & Water Co.	Glidden, Wis.	*Nov.
Hayward Electric Light & Power Co.	Haywood, Wis.	*Feb.
Municipal System	Rib Lake, Wis.	*Mar.
Latimer (A. H.) and Peterson (J. W.):		
Louisiana Light, Power & Traction Co. which was succeeded by Missouri Edison Co.	Bowling Green, Clarksville and Louisiana, Mo.	*Mar.
Lehigh Power Securities Corp. (Under supervision of Electric Bond & Share Co.):		
Berkshire Electric Co.	Pa.	*Jan.
Delta Electric Power Co.		
Harrisburg Light & Power Co.		
Lancaster County Railway & Light Co. including Edison Electric Co. of Lancaster and other subsidiaries		
Lebanon Valley Light & Power Co., and subsidiaries		
Long Beach Power Co.:		
Municipal Power Plant	Lynbrook, N. Y.	*Oct.

Companies Involved	Territory Served	Date of Merger
Louisiana Power & Light Co.: (Subsidiary of Electric Power & Light Corp. through Arkansas Light & Power Co.; under supervision of Electric Bond & Share Co.)		
Municipal Light & Water Plant	Bastrop, La.	*Oct.
McCurtain Light & Power Co. (Idabel, Okla.):		
Valliant Electric Light Co.	Valliant, Okla.	Sept
McGraw Electric Co.:		
Central West Public Service Co. (W. N. Albertson, Milwaukee, Wis.):		
Albion Electric Light Co.	Albion, Nebr.	*July
Amherst Electric Light Co.	Amherst, S. D.	*July
Bowman Electric Co.	Bowman, N. D.	*July
Britton Mill & Power Co., Inc.	Britton, S. D.	*July
Buffalo Elec. Lt., Heat & Power Co.	Buffalo, N. D.	*July
Gackle Light, Heat & Power Co.	Gackle, N. D.	*July
Hawkeye State Power Co.	Davenport, Iowa	*July
Hettinger Electric Light & Pwr. Co.	Hettinger, N. D.	*July
Medina Light & Power Co.	Medina, N. D.	*July
Northern Utilities Co.	Starkweather, N. D.	*July
Reeder Electric Light Plant	Reeder, N. D.	*July
SouthDakota Utilities Co.	Aberdeen, S. D.	*July
Streeter Electric Light System	Streeter, N. D.	*July
Tower City Light & Power Co.	Tower City, N. D.	*July
Three Rivers Light & Power Co.	Des Moines, Iowa	*July
Belmond Telephone Co.	Belmond, Iowa	*July
Columbus Gas Co.	Columbus, Nebr.	*July
Norfolk Gas & Fuel Co.	Norfolk, Nebr.	*July
Rapid City Gas & Fuel Co.	Rapid City, S. D.	*July
Platte Valley Power & Light Co.	Bemington, Elkhorn, Jackson, etc., Nebr.	*Nov.
Platte Valley Power Co. (Omana, Nebr.):		
Hooper Electric Light & Power Co.	Hooper, Nebr.	*Oct.
Water, Light & Power Co.	Hot Springs, S. D.	*Nov.
Middle West Utilities Co.:		
See also Central Illinois Public Service Co.		
Central Power & Light Co.		
Central Wisconsin Power Co.		
Chickasha Gas & Electric Co.		
East Texas Public Service Co.		
Illinois Northern Utilities Co.		
Interstate Public Service Co.		
Kansas Electric Power Co.		
Kentucky Utilities Co.		
Indianapolis Light & Heat Co. (28¼% interest)	Indiana	*Mar.
Missouri Gas & Electric Service Co. (Lexington, Mo.):		
Dearborn Electric Co.	Dearborn, Mo.	Feb.
National Electric Power Co.:		
Cumberland County Power & Light Co. (expected that this property will be merged with New England Public Service Co.)	Portland, Maine	*July
Eastern Kansas Power Co.	Eureka, Kans.	*July
Kansas Electric Power Co.	Lawrence, Kans.	*July
Michigan Electric Power Co.	Battle Axe, Mich.	*July
Northwest Power Co.		*July
Northwestern Public Service Co.	Huron, S. Dak.	*July
Ohio Electric Power Co.	Oberlin, Ohio.	*July
Penn Central Light & Power Co.	Altoona, Pa.	*July
Southwest Power Co. (McAlister, Okla.):	Ark., Ind., Kans., Ky., Maine, Mich., Nebr., Ohio, Okla., Pa., S. Dak., W. Va.	July
Pittsburg Water & Light Co.	Pittsburg, Okla.	April
New England Public Service Co.:		
National Light, Heat & Power Co.:		
Vermont Hydro Electric Corp:		
Dorset Electric Light Co., Inc.	Dorset, Vt.	Jan.
Public Service Co. of New Hampshire:		
Ashuelot Gas & Electric Co.	Keene, N. H.	*Oct.
Bradford Electric Co.	Bradford, Vt.	*May
Conway Electric Light & Power Co.	Conway, N. H.	Oct.
Fryeburg Electric Light Co.	Fryeburg, Maine	Oct.
Keene Gas & Electric Co.	Keene, N. H.	*Aug.
Laconia Gas & Electric Co.	Laconia, N. H.	*Aug.
Manchester Traction, Light & Power Co.	Manchester, N. H.	*Sept.
Souhegan Valley Electric Co.	Milford, N. H.	*Sept.
Southern New Hampshire Hydro-Electric Corp.	(Boston, Mass.)	Oct.
Swans Falls Co.	Fryeburg, Maine	Oct.
Western Maine Power Co.	Limerick, Maine	*April
North American Light & Power Co. (½ interest)		*Sept.
Pekin Light Co.	Pekin, Ind.	*Oct.
Public Service of Northern Illinois (Chicago):		
Municipal Distribution System	Lombard, Ill.	*Nov.
Public Service Co. of Okla.:		
Choteau Electric Light Co.	Choteau, Okla.	Nov.
Public Service Co. of Vermont (Rutland):		
Hortonia Power Co.	Brandon, Vt.	*Nov.
Southern Wisconsin Electric Co. (Lake Geneva, Wis.) (Subsidiary of North West Utilities Co.):		
Carey Electric Light & Power Co.	Slades Corner, Twin Lakes and Bassett, Wis.	*Oct.
Southern Wisconsin Power Co. (Madison, Wis.) (Subsidiary of North West Utilities Co.):		
Friendship Electric Light & Power Co.	Friendship, Wis.	*Mar.
Southwestern Gas & Electric Co. (Subsidiary of Central and South West Utilities Co., through Southwestern Securities Co.):		
Central Power & Light Co.	Ashdown, Ark.	*Aug.
Mena Electric Light Plant	Mena, Ark.	*Aug.
Waldron Electric Light & Power Co.	Waldron, Ark.	*May
Southwestern Light & Power Co. (Lawton, Okla.) (Subsidiary of Central and South West Utilities Co.):		
Gould Electric Light Co.	Gould, Okla.	Aug.
Inland Utilities Co.	All properties in Oklahoma including Hobart, Elk City, Shattuck, etc.	April

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Companies Involved	Territory Served	Date of Merger
Municipal Systems	Lone Wolf, Okla.	*May
	Sayre and Weatherford, Okla.	*Oct.
Texas Central Power Co. (San Antonio, Texas) (Subsidiary of Central and South West Utilities Co., through Central Power & Light Co.):		
Brackettville Electric & Ice Plant	Brackettville, Texas	*May
Cotulla Light & Ice Co.	Cotulla, Texas	*Mar.
Goliad Supply Co.	Goliad, Texas	*Mar.
Hebbronville Electric Light Plant	Hebbronville, Texas	*Mar.
Moulton Light & Ice Co.	Moulton, Texas	*May
Pagel Electric & Ice Co.	Schulenburg, Texas	*Mar.
Sabinal Utilities Co.	Sabinal, Texas	*Mar.
Three Rivers Electric Light Plant	Three Rivers, Texas	*Mar.
Valley Electric & Ice Co. (San Benito, Tex.) (Subsidiary of Central Power & Light Co.):		
Municipal Light & Water Plant	Edinburg, Tex.	*June
West Texas Utilities Co. (Abilene, Tex.) (Subsidiary of Central & South West Utilities Co., through American Public Service Co.):		
Bronte Light & Power Co.	Bronte, Texas	June
Crowell Utilities Co.	Crowell, Texas	Sept.
Junction Light Plant	Junction, Tex.	*Jan.
Wisconsin Power & Light Co. (Madison, Wis.) (Subsidiary of North West Utilities Co.):		
Beloit Water, Gas & Electric Co.	Beloit, Wis.	*May
Cambridge-Albion Electric Co.	Cambridge, Albion, London and Lake Ripley, Wis.	*Feb.
Central Wisconsin Power Co.	Madison, Wis.	*Sept.
Delton Electric Co.	Delton, Wis.	*April
Friendship Electric Light & Power Co.	Friendship, Wis.	Aug.
Iola Light, Power & Manufacturing Co.	Iola, Wis.	*Mar.
Ironton Milling & Light Plant	Ironton, Wis.	Aug.
Macfarland Light & Power Co.	Macfarland, Wis.	*Jan.
Merrimac Electric Co.	Merrimac, Wis.	Aug.
Municipal Electric Light Plant	Milton Junction, Wis.	*Oct.
Municipal Electric Plants	Blanchardville, Wis.	*April
	Milton, Wis.	*Aug.
Municipal Systems	Middleton, Wis.	*Feb.
	Fox Lake, Wis.	*Mar.
Scandinavian Light & Power Co.	Scandinavia, Wis.	*Mar.
Southern Counties Power Co.	To be known as District H: Paoli, Bosco, Belleville, Monticello, McFarland, Verona, Brooklyn, New Glarus, Stewart and Blanchardville, Wis.	*Feb.
Trenton Light & Power Co.	Fox Lake and Trenton, Wis.	Aug.
Midland Utilities Co.:		
Indiana Service Corp. (Fort Wayne, Ind.):		
Berne Electric Co.	Berne, Ind.	*Aug.
Bryant Electric Co.	Bryant, Ind.	*Aug.
Marion & Bluffton Traction Co.	Bluffton, Ind.	*Aug.
Wells County Electric Co.	Indiana	*Aug.
Northern Indiana Public Service Co.:		
Calumet Gas & Electric Co.	Gary, Ind.	*Feb.
Holley Electric Co. (L. D.)	South Milford, Ind.	*Feb.
Northern Indiana Gas & Electric Co.	Hammond, Ind.	*June
Mid-State Utilities Co.:		
English Milling Co.	English, Ind.	*Oct.
Georgetown Electric Light & Power Co.	Georgetown, Ind.	*Oct.
Leavenworth Electric Light Co.	Leavenworth, Ind.	*Oct.
Marengo Milling Co.	Marengo, Ind.	*Oct.
Palmyra Light & Power Co.	Palmyra, Ind.	*Oct.
Pekin Light Co.	Pekin, Ind.	*Oct.
Municipal Plant	Birdseye, Ind.	*Oct.
Midwestern Power Co. (Casper, Wyo. and Salt Lake City, Utah):		
Midwest Public Service Co. (Casper, Wyo. and Salt Lake City, Utah): (sold to H. M. Byllesby & Co., to be operated as part of Casper, Wyo. div. of Mountain States Power Co., a subsidiary of Standard Gas & Electric Co.)		
Big Horn Light & Power Co.	Worland, Wyo.	*Jan.
Big Horn Utilities Co.	Greybull, Wyo.	*Jan.
Forsyth Light & Power Co.	Forsyth, Mont.	*Jan.
Hudson Light & Power Co.	Hudson, Wyo.	*Jan.
Lovell Gas & Electric Co.	Lovell, Wyo.—Northern end of Big Horn basin; 37 mi. from Greybull	*May
Newcastle Light & Power Co.	Newcastle, Wyo.—45 mi. from Edgemont, S. D.	*May
Platte Valley Power Co.	Yoder, Wyo.	*Jan.
Popo Agie Light & Power Co.	Riverton, Wyo.	*Jan.
Western Utilities Co.	Edgemont, S. Dak.	*Jan.
Minnesota Northern Power Co. (Minneapolis, Minn.):		
Montana-Dakota Power Co. (Williston, N. D.)	Eastern Montana and Western North Dakota	*Jan.
Eastern Montana Light & Power Co.	Glendive, Mont.	*Jan.
Jennison Light & Power Co.	Fairview, Mont.	Jan.
Listerud Power Co.	Wolf Point, Mont.	Jan.
Medicine Lake Electric Utilities Co.	Medicine Lake, Mont.	*Nov.
Montana Utilities Co.	Montana	*Jan.
Municipal Light System	Watford, N. D.	Nov.
	White Earth, N. D.	Nov.
Plentywood Electric Co.	Plentywood, Mont.	*Jan.
Ray Electric Co.	Ray, N. Dak.	*Jan.
Scobey Utilities Co., Inc.	Scobey, Mont.	*Jan.
Stanley Public Utility Co.	Stanley, N. D.	*Jan.
United Power Co.	Crosby, N. D.	*Jan.
Williston Light, Heat & Power Co.	Williston, N. D.	*Jan.
Missouri Edison Co. (Louisiana, Mo.):		
Municipal Plant	Elsberry, Mo.	*April
Missouri Electric Co.:		
Municipal System & Plant	Fredericktown, Mo.	*July
Mohawk Hudson Power Corp. (Albany, N. Y.):		
See also Adirondack Power & Light Corp. Fulton County Gas & Electric Co.		
Eastern New York Utilities Corp.	Rensselaer, N. Y.	*July
Blue Hill Light & Power Corp.	Livingston, N. Y.	*July
Mexico Electric Co.	Mexico, N. Y.	*Aug.
Mohawk Valley Securities Corp.		*Aug.
Seneca River Power Co.	Baldwinsville, N. Y.	*Aug.
Syracuse Lighting Co.	Syracuse, N. Y.	*Aug.
Troy Gas Co. (Electric Dept.)	Troy, N. Y.	*Oct.
Utica Gas & Electric Co. (Utica, N. Y.):		
Central New York Power Co.	Canastota, N. Y.	*Nov.
Newport Electric Light & Power Co.	Newport, N. Y.	*Nov.

Companies Involved	Territory Served	Date of Merger
Montana Power Co. (Butte, Mont.):		
Municipal Power Plant	Glasgow, Mont.	*Sept.
Montreal Light, Heat & Power Consolidated:		
Quebec-New England Hydro-Electric Corp.	Montreal, Que., Canada	*May
Monument Hill Electric Co.:		
Hot Springs Light & Power Co.	Thermopolis, Wyo.	*Mar.
Moravia Electric Light, Heat & Power Co.:		
Berholme Power Co.	Holmesville, N. Y.	*Dec.
Delancey Electric Light Co.	Hamden, N. Y.	*Dec.
Hamden Electric Light Co.		
Morrison-McCall Interests (St. Louis, Mo.):		
Compania Electrica del Chapala	Guadalajara, Mexico	*Feb.
Morrow Public Service Co. (Cardington, Ohio):		
Ashley Electric Light, Heat & Power Co.	Ashley, Ohio	*July
Mount Spokane Power Co. (Deer Park, Wash.):		
Kutzer Electric System	Gray, Kutzer, Springdale and Valley, Wash.	*Mar.
Nevada-California Electric Corp.:		
Yuma Utilities Co.	South of Yuma, Ariz.	*Oct.
New Brunswick Electric Power Commission (Musquash, N. B., Canada):		
Municipal Plant	Shediac, N. B.	Sept.
Shediac Electric Light & Power Co.	Shediac, N. B.	Sept.
New England Power Association:		
Narragansett Electric Lighting Co.	Providence, R. I.	*Oct.
New England Co.:		
Bellows Falls Power Co.	Bellows Falls, Vt.	Jan.
Connecticut River Power Co. of N. H.	Brattleboro, Vt.	Jan.
Fall Mountain Electric Co.	Bellows Falls, Vt.	Jan.
Grafton County Electric Light & Power Co.	Lebanon, N. H.	Jan.
New England Power Co.	Worcester, Mass.	Jan.
Rhode Island Power Transmission Co.	Pawtucket, R. I.	Jan.
New Hampshire Power Co. (Newport, N. H.):		
Bradford Light & Power Co.	Bradford, N. H.	*June
Bristol Electric Light Co.	Bristol, N. H.	*June
Pittsfield Light & Power Co.	Pittsfield, N. H.	*June
New Mexico Power Co. (Subsidiary of Federal Light & Traction Co.):		
Santa Fe Water & Light Co.	Santa Fe, N. Mex.	*July
North American Co.:		
North American Edison Co.:		
See also Cleveland Electric Illuminating Co. Great Western Power Co. of Calif.		
Iron Mountain Electric Light & Power Co.	Iron Mountain, Mich.	*Feb.
Milwaukee Electric Railway & Light Co.:		
Wells Power Co.	Milwaukee, Wis. (downtown district)	*Sept.
Niagara Light & Power Co.	Niagara, Wis.	*Feb.
Wisconsin Gas & Electric Co. (Racine, Wis.):		
Carey Electric Light & Milling Co.	Wilmot, Wis.	*Aug.
Municipal Water & Light Plant	Fort Atkinson, Wis.	*Nov.
Woodland Light & Power Co.	Herman, Hubbart and Rubicon, Wis.	*Nov.
Wisonsin Traction, Light & Power Co. (Appleton, Wis.):		
Wisconsin Northern Light, Heat & Power Co.	Waushara, Waupaca and Winnebago Counties, Wis.	*Nov.
North American Light & Power Co. (⅛ interest) (see also Middle West Utilities Co.)		*Sept.
Peninsular Power Co.:		
Alpha Lighting Co.	Alpha, Mich.	*June
Amasa Lighting Co.	Amasa, Mich.	*June
Aurora Electric Light & Power Co.	Aurora, Wis.	*June
Dickinson County Public Service Co.	bet. Crystal Falls and Channing, Mich.	*June
Loretto Light & Power Co.	Loretto, Mich.	*June
Powers-Spaulding Light & Power Co.	Powers, Mich.	*June
Union Electric Light & Power Co. of Ill.	East St. Louis, Ill.	Feb.
Union Electric Light & Power Co.	St. Louis, Mo.	
Alton Light & Power Co.	Alton, Ill.	*July
Alton Gas & Electric Co. (light and power properties only)	Alton, Ill.	*July
Central Mississippi Valley Electric Properties:		
Dallas City Light Co.	Dallas City, Ill.	Feb.
Fort Madison Electric Co.	Fort Madison, Iowa	Feb.
Keokuk Electric Co.	Keokuk, Iowa	Feb.
North American Light & Power Co. (Del.)	Middle West Utilities Co. and North American Co. each own ⅛ interest in the common stock	*Sept.
See also Illinois Power & Light Corp.		
North American Light & Power Co. (Maine):		
United Power & Light Corp. (Albilene, Kans). (Subsidiary of Illinois Power & Light Corp. through Kansas Power & Light Co.):		
Municipal Distribution System	Hillsboro, Kans.	*Aug.
Smith Center Light Plant (sold to Kansas Power Co., Concordia, Kansas)	Smith Center, Kans.	April
West Missouri Power Co.	Pleasant Hill, Mo.	*Jan.
Northeastern Power Corp.:		
Eastern New York Utilities Corp.	Rensselaer, N. Y.	*Feb.
New England Power Assoc. (236,191 shares common stock)		June
Oswego River Power Corp.	Oswego, N. Y.	*June
Power Corp. of New York	Watertown, N. Y.	Jan.
People's Gas & Electric Co.	Oswego, N. Y.	*Mar.
Northern Connecticut Power Co. (Hartford, Conn.) (all subsidiaries of J. G. White & Co.):		
Connecticut River Power Co.	Brattleboro, Vt.	*Mar.
Northern Connecticut Light & Power Co.	Thompsonville, Conn.	*Mar.
Northern Connecticut Power Co.	Connecticut	*Mar.
Somers Electric Co.	Somers, Conn.	*Mar.
Stafford Springs Aqueduct Co.	Stafford Springs, Conn.	*Mar.
Thompsonville Water Co.	Thompsonville, Conn.	*Mar.
Northern Ohio Power Co.:		
Northern Ohio Power & Light Co.:		
Northern Ohio Traction & Light Co.	Akron, Ohio	Mar.
Northern Power & Light Co. (Mobridge, S. D.):		
Farmers Co-operative Milling Co.	Bowdle, S. Dak.	Sept.
Municipal Light & Power Plant	McIntosh, S. D.	Nov.
Municipal Electric Light System	Roscoe, S. D.	Jan.
Northwestern Illinois Utilities Co. (Savanna, Ill.):		
Mt. Carroll Electric Light Co.	Mt. Carroll, Ill.	*Mar.
People's Gas & Electric Co.	Savanna, Ill.	*Jan.

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Companies Involved	Territory Served	Date of Merger
Northwestern Light & Power Co. (Cedar Rapids, Iowa):		
Citizens Electric Co.	Albert City, Iowa	Sept.
Durst Power Co.	Danbury, Iowa	Jan.
Western Iowa Power Co.	Peterson, Iowa	April
Orange & Rockland Electric Co. (Monroe, N. Y.):		
Central Hudson Gas & Electric Co. (Electric service in Blooming Grove only)	Blooming Grove, N. Y.	*Oct.
Tuxedo Electric Light Co.	Tuxedo, N. Y.	*Jan.
Otter Tail Power Co. (Del.):		
Otter Tail Power Co. (Minn.):		
Electric Light Plants	Adams and Ardoch, N. Dak.	*Mar.
Finlay Light & Power Co.	Finlay, N. Dak.	*Jan.
Fordville Garage & Light Plant	Fordville, N. Dak.	*Mar.
James Lang Electric Light & Power House	Cavalier, N. Dak.	Sept.
Langdon Light Co.	Langdon, N. Dak.	Sept.
Maegeli Bros.	Hoople, N. Dak.	Sept.
Minto Electric Light Plant	Minto, N. Dak.	* Mar.
Municipal Electric Light Plant	Lankin, N. Dak.	*Mar.
Oriska Distribution System	Oriska, N. Dak.	*Sept.
Paxman (G. L.) Electric Property	Hamilton, N. Dak.	*June
Walhalla Electric Power Plant	Walhalla, N. Dak.	*Mar.
Pacific Gas & Electric Co.:		
Bell Electric Co.	Auburn, Calif.	*Aug.
California Telephone & Light Co. (Pacific Gas & Electric Co.):		
Lake County Water & Power Co.	Kelseyville, Calif.	*Oct.
Middle Yuba Hydro-Electric Co.	Alleghany and Pike City, Cal.	*Jan.
Pea River Power Co. } jointly: River Falls Power Co. } Opp Light & Power Co.	Opp. Ala.	*Mar.
Pennsylvania-Ohio Power & Light Co. (Youngstown, Ohio) (Subsidiary of Republic Railway & Light Co., through Penn-Ohio Edison Co.):		
East Ohio Power & Light Co.	Lectonia and Lisbon, Ohio.	*June
Pennsylvania-Ohio Power & Light Co. all electric light and power properties in Ohio formerly operated by Pennsylvania-Ohio Electric Co.	Youngstown, Ohio.	*June
Peters, Geo. T. (Columbus, N. Mex.):		
Columbus Ice & Electric Co.	Columbus, N. Mex.	Sept.
Portland Electric Power Co. (Oregon):		
Puget Sound Power & Light Co.	Eastern Division supplying Hillsboro, Beaverton, Orenco, Cornelius, Dilley and Gaston, Ore.	*Jan.
Potomac Valley Power Corp. (Petersburg, W. Va.):		
Romney Electric Co.	Romney, W. Va.	Oct.
Quebec Southern Power Co.:		
Laurentian Hydro-Electric Co.:		
Municipal Plant	St. Jerome, Que.	*April
Rainy River Improvement Co.:		
Ranier Electric Plant	Ranier, Minn.	*Sept.
Ralston, Stuart; purchased W. C. Sparks' interest in:		
Roscoe Electric Co.	Roscoe, Ill.	*Feb.
Cherry Valley Light & Power Co.	Cherry Valley, Ill.	*July
Drager Electric Co.	Winnebago, Ill.	*July
Rochester Gas & Electric Corp. (N. Y.) (Subsidiary of Mohawk Valley Co.):		
Adams Basin Electric Light & Power Co., Inc.	Adams Basin, N. Y.	*Aug.
Rockland Light & Power Co. (Under management of Charles H. Tenney & Co.):		
American Silk Label Manufacturing Co.	Unionville and Minisink, N. Y.	July
Unionville Electric Light Plant	Unionville, N. Y.	Aug.
Catskill Power Corp.	Middletown, N. Y.	*Feb.
Orange County Public Service Co.	Middletown, N. Y.	*Feb.
Rockland Light & Power Co.	Nyack, N. Y.	*May
Rockport Water Works Co. (Rockport, Ind.):		
Dale Light & Power Co.	Dale, Ind.	Sept.
Rust, Herbert B. (Meredith, N. H.):		
Warren Light & Power Co.	Warren and Wentworth, N.H.	*Oct.
Ryan, F. R.:		
North Branch Electric Works (R. G. Green)	North Branch, Mich.	*Oct.
St. Lawrence County Utilities Inc. (Potsdam, N. Y.):		
Brier Hill Electric Light & Power Co.	Brier Hill, N. Y.	*June
DeKalb Electric Light Plant	DeKalb, N. Y.	*Aug.
Gregory Electric Co.	Morristown, N. Y.	*Jan.
Rensselaer Falls Electric Light & Power Co.	Rensselaer, N. Y.	*Jan.
Shawinigan Water & Power Co.—20% Aluminum Corporation of America—53⅓% Duke-Price Power Co.—26⅔%	Lake St. John and Grand Discharge on Saguenay River, Que.	*May
Shenandoah River Power Co. (Weyer's Cave, Va.):		
North River Electric Co.	Bridgewater, Va.	*Feb.
Valley Power Co.	Grove Hill, Va.	*Jan.
Simpson Logging Co. (Shelton, Wash.):		
Reed Mill Co.	Shelton, Wash.	July
Solar Electric Co. (Brookville, Pa.):		
Municipal Electric System	Brookville, Pa.	Nov.
Southeastern Power & Light Co.	Virtually all of Alabama, Eastern half of Mississippi, Northwestern Florida and Northern half of Georgia	
See also Georgia Power Co. Georgia Railway & Power Co. Georgia Southern Power Co.		
Athens Railway & Electric Co.	Athens, Ga.	*June
Georgia Light, Power & Railways:		
Central Georgia Power Co.	Macon, Ga.	May
Central Georgia Transmission Co.	Macon, Ga.	May
Georgia Public Service Corp.	Macon, Ga.	May
Macon Railway & Light Co.	Macon, Ga.	May
Macon Gas Co.	Macon, Ga.	May
Gulf Power Co. (Pensacola, Fla.):		
Chipley Light & Power Co.	Chipley, Fla.	June
Municipal Electric Light Plant	Millville, Fla.	Mar.
Pensacola Electric Co.	Pensacola, Fla.	May
St. Andrews Ice & Power Co.	St. Andrews, Fla.	Sept.
Georgia Railway & Power Co.	Atlanta, Ga.	*June
Georgia Utilities Co.	Northern Ga.	*June
Gulf Electric Co.:		
Municipal Electric Light Plants	Ozark, Ala.	Nov.
	Slocomb, Ala.	April

Companies Involved	Territory Served	Date of Merger
Interstate Utilities Corp. (Washington, D. C.):		
Georgia Southern Power Co.	Dublin, Ga.	*June
Milledgeville Lighting Co.	Milledgeville, Ga.	*Sept.
Oklawaha Power Co.	Leesburg, Fla.	*Sept.
Rome Railway & Light Co.	Rome, Ga.	*Sept.
South Carolina Power Co.:		
Charleston-Edison Light & Power Co. Charleston Consolidated Railway, Gas & Electric Co. Charleston Consolidated Railway & Lighting Co. Charleston Gas Light Co.	Charleston, S. C.	*Nov.
Southern Cities Power Co. (Chattaoonga, Tenn.):		
Commercial Light & Power Co.	Pikeville, Tenn.	April
Fayetteville Electric Light & Power Co.	Fayetteville, Tenn.	*Feb.
Lynchburg Light & Power Co.	Lynchburg, Tenn.	*Sept.
Sequatchie Valley Power & Light Co.	Pikeville, Tenn.	*Mar.
Southern Michigan Light & Power Co. (Jackson):		
Avis Light & Power Co.	Waldron, Mich.	Jan.
Southern Nebraska Power Co. (Superior, Nebr.):		
Harvard Electric Co. (Person Bros.)	Harvard, Nebr.	*May
Southern Ohio Electric Co. (Nelsonville):		
Athens Electric Co.	Athens, Ohio.	Sept.
Southern Power Co. (Charlotte, N. C):		
Catawba Power Co.	Rock Hill, S. C.	Sept.
Connelly Springs Light & Power Co.	Connelly Springs, N. C.	Feb.
Municipal Electric Plant	Kernersville, N. C.	*July
Southern Public Utilities Co. (Charlotte, N. C.):		
Municipal Water & Light Plant	Elkin, N. C.	July
Surry Power Co.	Mt. Airy, N. C.	*April
Standard Gas & Electric Co.:		
California Power Corp.:		
California Oregon Power Co.	San Francisco, Calif.	*Feb.
Mountain States Power Co.:		
Midwest Public Service Co.	12 communities in Wyoming, Southeastern Montana and Southwestern South Dakota	*Nov.
Northern States Power Co. (Subsidiary of Northern States Power Co. (Del.)):		
Belview Electric Light & Power Co.	Belview, Minn.	*Nov.
Blunt Light & Power Co.	Blunt, S. D.	*Nov.
Chippewa Power Co.	Jim Falls plant on Chippewa River (Western Wis.)	*Feb.
Municipal Electric Light Systems	Hatton, N. Dak.	*Nov.
	Greenwood, Wis.	*Sept.
	Loyal and Westby, Wis.	*Aug.
Municipal Electric Plant	Leola, S. D.	*Nov.
St. Paul Gas Light Co.	St. Paul, Minn.	*Jan.
Oklahoma Gas & Electric Co. (Oklahoma City, Okla.):		
Consumers Light & Power Co.	Ardmore, Okla.	*Jan.
Chandler Electric Co.	Chandler, Okla.	*May
United Power Co.	Helena, Okla.	*May
Marietta Light & Water Co.	Marietta, Okla.	*Aug.
Municipal Electric Distribution System	McLoud, Okla.	*Sept.
United Power Co.	Helena, Okla.	*May
Southern Colorado Power Co. (Pueblo, Colo.):		
Arkansas Valley Electric Co.	Florence, Coal Creek, Rockville and Williamsburg, Ark.	*June
United Railways Investment Co.	Pittsburgh, Pa.	*April
Philadelphia Co.	Pittsburgh, Pa.	*April
Pittsburgh Utilities Corp.	Pittsburgh, Pa.	*April
Duquesne Light Co.	Pittsburgh, Pa.	*April
Equitable Co.	Pittsburgh, Pa.	*April
Pittsburgh Railways Co.	Pittsburgh, Pa.	*April
Wisconsin Public Service Corp. (Green Bay, Wis.):		
Denmark Light & Power Co.	Denmark, Wis.	*Jan.
Northeastern Power Co.	Water power construction	*Jan.
Northern Heat, Light & Power Co.	5 villages in Wis.	*Jan.
Wabeno Lighting Co.	Wabeno, Wis.	*Jan.
Stone & Webster, Inc.:		
See also Engineers Public Service Co. Galveston Electric Co.		
Municipal Plant	Sidney, Neb.	*July
Puget Sound Power & Light Co. (Seattle, Wash.):		
Avery Public Utilities Co.	Avery, Wash.	*Mar.
Lake Rutledge Electric Light Co.	Long Lake and Hicks Lake districts near Olympia, Wash.	*May
Municipal Light & Power System	Oakville, Wash.	*Mar.
North Pacific Public Service Co.	Bremerton, Wash.	Jan.
Northwestern Power Mfg. Co.	Washington	Jan.
People's Utility Co.	Rochester, Wash.	*Mar.
Sequin Light & Power Co. (two power sites on)	Dungeness River, Wash.	Jan.
Sultan Electric Co.	Sultan, Wash.	*June
South Georgia Power Co. (Albany, Ga.) (Subsidiary of Columbus Electric & Power Co.):		
Georgia-Alabama Power Co.	Albany, Ga.	*Jan.
South Georgia Public Service Co.	Albany, Ga.	*Jan.
Municipal Distribution System	Dawson, Ga.	*April
Municipal Water & Light Plant	Reynolds, Ga.	*Aug.
White Water Power Co.	Montezuma, Ga.	July
Western Public Service Co. (Denver, Colo.) (Subsidiary of Engineers' Public Service Co. through Eastern Texas Electric Co.):		
Madisonville Light & Power Co.	Madisonville, Tex.	*Jan.
Suburban Light & Power Co. (Columbus, Ohio):		
General Light & Power Co.	Columbus, Ohio.	
Suburban Public Service Co.	Columbus, Ohio.	
Suburban Power Co. (Columbus, Ohio):		
Big Walnut Electric Co.	Sunbury, Ohio.	*Jan.
Bloomville Electric Co.	Bloomville, Ohio.	*Jan.
Commonwealth Power Co.	Gambier, Danville, Buckeye City and North Canton, Ohio.	*Jan.
Dresden Illuminating Co.	Dresden, Ohio.	*Jan.
Evans Light & Power Co.	Frazeysburg.	*Jan.
Hancock Light & Power Co.	Jenera and Denton Ridge, Ohio.	*Jan.
McComb Light & Power Service Co.	McComb, Ohio.	*Jan.
Midwest Power Co.	Utica, Ohio.	*Jan.
Payne Light & Power Service Co.	Payne, Ohio.	*Jan.
Van Lue Electric Light Co.	Van Lue, Ohio.	*Jan.

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Companies Involved	Territory Served	Date of Merger
Swenson, W. G. (Abilene, Texas):		
Citizens' Light & Power Co.	Fredericksburg, Texas	*Mar.
Teton Valley Power & Milling Co. (Diggs, Idaho):		
Municipal Lighting System	Victor, Idaho	Nov.
Texas-Louisiana Power Co. (Fort Worth, Texas):		
Central Texas Power & Transmission Co.	Hico, Texas	April
Continental Gas, Light & Power Co.	Fort Worth, Texas	Jan.
Gatesville Light & Power Co.	Gatesville, Texas	Jan.
Farmersville Mill & Light Co.	Farmersville, Texas	*June
Howard Brodhead Co.	Whitewright, Texas	*April
Lordsburg Power Co.	Lordsburg, N. Mex.	Jan.
Pecos Light & Ice Co.	Pecos, Texas	Jan.
St. Jo Light & Power Co.	St. Jo, Texas	Jan.
Southwestern Gas, Light & Power Co.	Fort Worth, Texas	Jan.
Newcastle Light, Power & Ice Co.	Newcastle, Texas	Jan.
Olney Light & Power Co.	Olney, Texas	Jan.
Texas Utilities Co. (Plainview, Texas) (Subsidiary of Community Power & Light Co.):		
Lamb County Utilities Co.	Sudan, Texas	*Feb.
Muleshoe Plant	Texas	*Feb.
Union Edison Co. (Chicago, Ill.):		
Blasdel & Braly Light & Power Co.	Buffalo, Okla.	Mar.
Bloomfield Utilities	Bloomfield, Ky.	*June
Lebanon Junction Light & Power Co.	Lebanon Junction, Ky.	*June
Ohio Valley Public Service Co.		Mar.
Ozark Public Service Co.	Rolla, Mo.	Mar.
Panhandle Public Service Co.		Mar.
Salem Light & Power Co.	Salem, Mo.	Mar.
Steelville Electric Light & Power Co.	Steelville, Mo.	Mar.
Taylorsville Electric Co.	Taylorsville, Ky.	*June
Tucumcari Light & Power Co.	Tucumcari, N. Mex.	Mar.
Union Gas & Electric Co. (Cincinnati, Ohio):		
Municipal Plant	Oxford, Ohio	*Jan.
United Gas Improvement Co. (Philadelphia, Pa.):		
See also Central Iowa Power & Light Co.		
Connecticut Light & Power Co.		
Iowa Light, Heat & Power Co.		
Connecticut Electric Service Co.	Hartford, Conn.	Nov.
Bristol & Plainville Electric Co.	Bristol, Conn.	Nov.
Connecticut Light & Power Co.	Waterbury, Conn.	Nov.
Eastern Connecticut Power Co.	Norwich, Conn.	Nov.
Baltic Mills Co.	Baltic Mills, Conn.	Sept.
Meriden Electric Light Co.	Meriden, Conn.	Nov.
New Milford Electric Light Co.	New Milford, Conn.	Nov.
Westport Electric Co.	Westport, Conn.	Nov.
Woodbury Electric Co.	Woodbury, Conn.	Nov.
George Electric Light & Power Co.	George, Iowa	*Nov.
United Light & Power Co. (The):		
See also Columbus Railway Power & Light Co.		
Iowa Railway & Light Co.		
Kansas City Power & Light Co.		
Lincoln Public Service Co.	Lincoln, Nebr.	*Mar.
Lincoln Gas & Electric Co.	Lincoln, Nebr.	*Mar.
Lincoln Traction Co. (electric light and power and central station heating business)	Lincoln, Nebr.	*Mar.
United Light & Railways Co.:		
Nebraska Gas & Electric Co. (Lincoln, Nebr.) (Subsidiary of Continental Gas & Electric Corp.):		
Beemer Mills & Light Plant	Beemer, Nebr.	May
Blue River Power Co.	Seward, Nebr.	*May
Kotes (J. U.) & Placek (F. A.) Lighting Plant	Milligan, Nebr.	*Aug.
United Ohio Utilities Co.:		
Ohio Utilities Co.	Columbus, Ohio	*July
Southern Ohio Electric Co.	Nelsonville, Ohio	July
Athens Electric Co.	Athens, Ohio	Sept.
Utilities Power & Light Corp. (Chicago, Ill.):		
See also Derby Gas & Electric Corp.		
Eastern New Jersey Power Co.		
Citizens' Utilities, Inc.:		
Derby Gas & Electric Co.	Derby, Conn.	*June
Indianapolis Power & Light Corp.	Indianapolis, Ind.	*May
Indianapolis Light & Heat Co.	Indianapolis, Ind.	May
Interstate Power Co. (Chicago, Ill.):		
Minnesota Electric Distributing Co.	Minneapolis, Minn.	May
Minnesota Electric Light & Power Co.	Bemidji, Minn.	*Jan.
Red River Valley Power Co.	Crookston, Minn.	*Jan.
Cass Water, Light & Power Co.	Cass Lake, Minn.	Aug.
Minnesota Electric Light & Power Co. (Minneapolis, Minn.):		
Red River Power Co. (Grand Forks, N. Dak.):		
Electric Construction Co.	Buxton, Reynolds and Thompson, N. D.	*May
Municipal Electric Light Plant	Grand Forks, N. D.	Nov.
St. Ansgar Light & Power Co.	St. Ansgar, Iowa	*Dec.
Soldiers' Grove Electric Light Co.	Soldiers' Grove, Wis.	*Dec.
Tri-State Utilities Co. (Minneapolis, Minn.):		
Ainsworth Light & Power Co.	Ainsworth, Neb.	Sept.
Brunswick Electric Co.	Brunswick, Neb.	Sept.
Mahood Bros.	Orchard, Neb.	Aug.
Osmond Electric Light Co.	Osmond, Neb.	*Feb.
Municipal Electric Light Plants	Erskine, Minn.	*Oct.
	Oklee, Minn.	*Oct.
	Middle River, Mo.	*Nov.
	Plummer, Mo.	*Nov.
Warm Springs Electric Light Co. (Warm Springs, Ga.):		
Bullochville Electric Co.	Bullochville, Ga.	Sept.
Wateree Power Co.:		
Spencer Mountain Mills	Lowell, N. C.	Mar.
Westerlo Electric Service, Inc.:		
Upper Hudson Electric & Railroad Co.	Catskill, N. Y.	*Dec.
Wisconsin Valley Electric Co. (Wausau, Wis.):		
Antigo Electric Co.	Antigo, Wis.	*Jan.
Rhinelander Light & Power Co.	Rhinelander, Wis.	*Jan.
Wooster Electric Co. (Wooster, Ohio):		
Inter-Urban Electric Co.	Mt. Eaton, Ohio	Sept.

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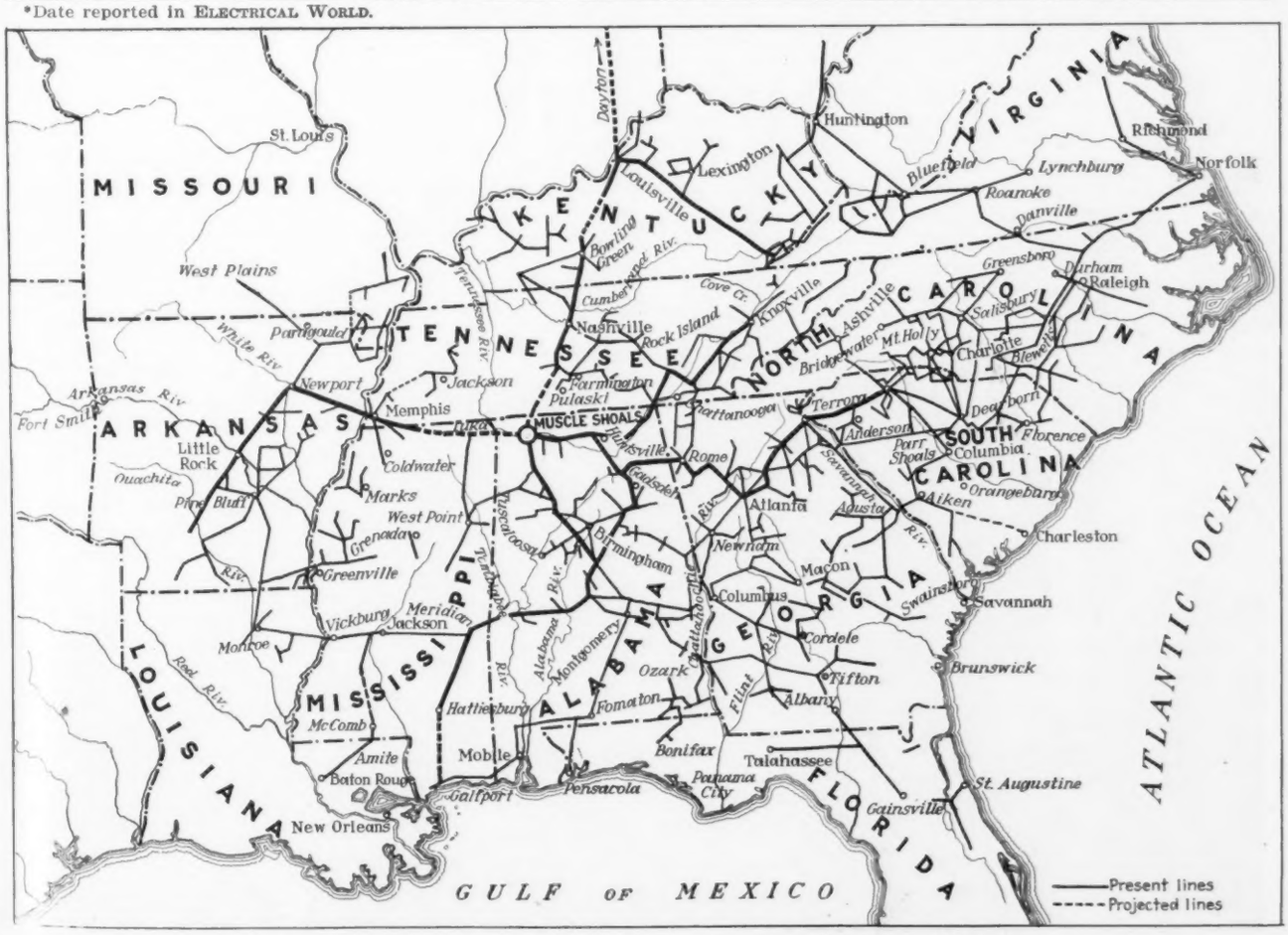
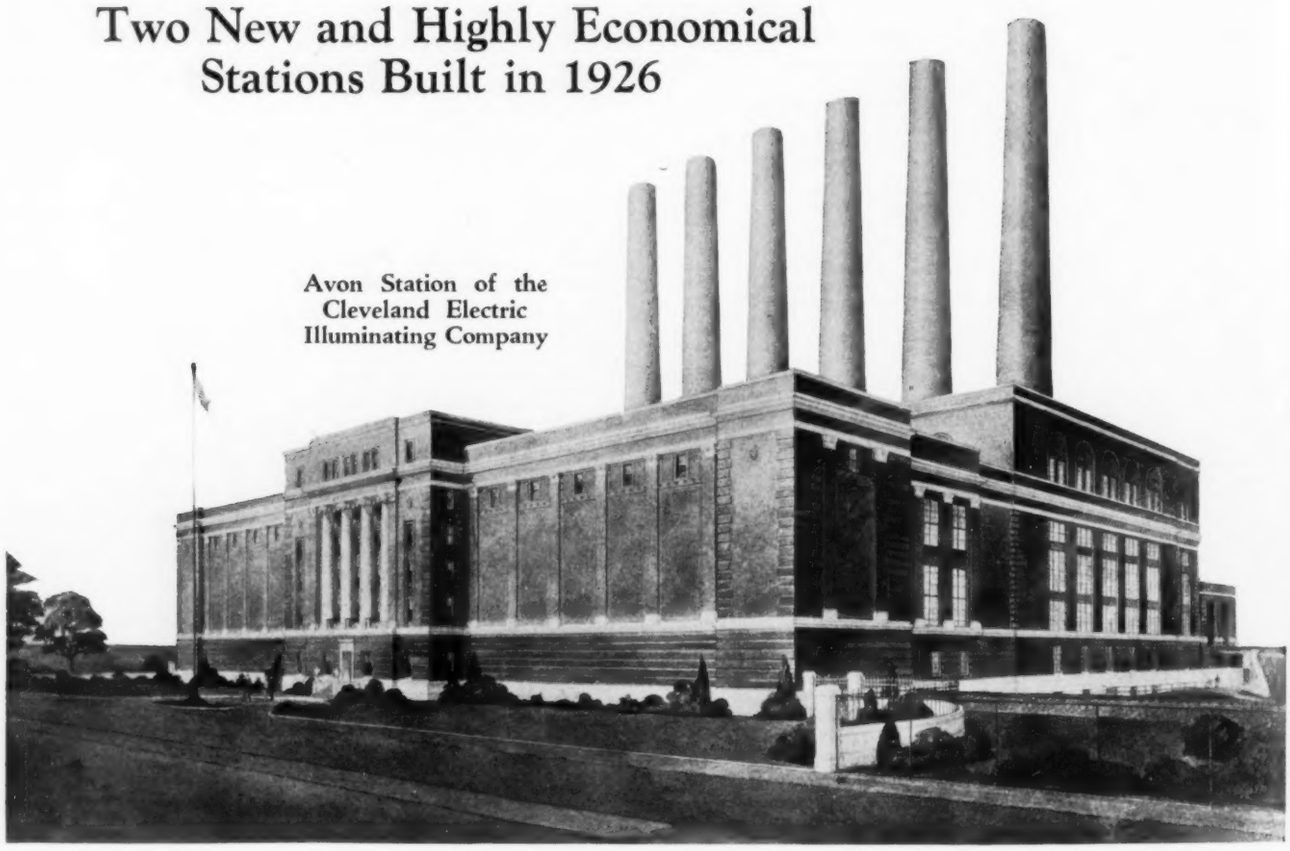
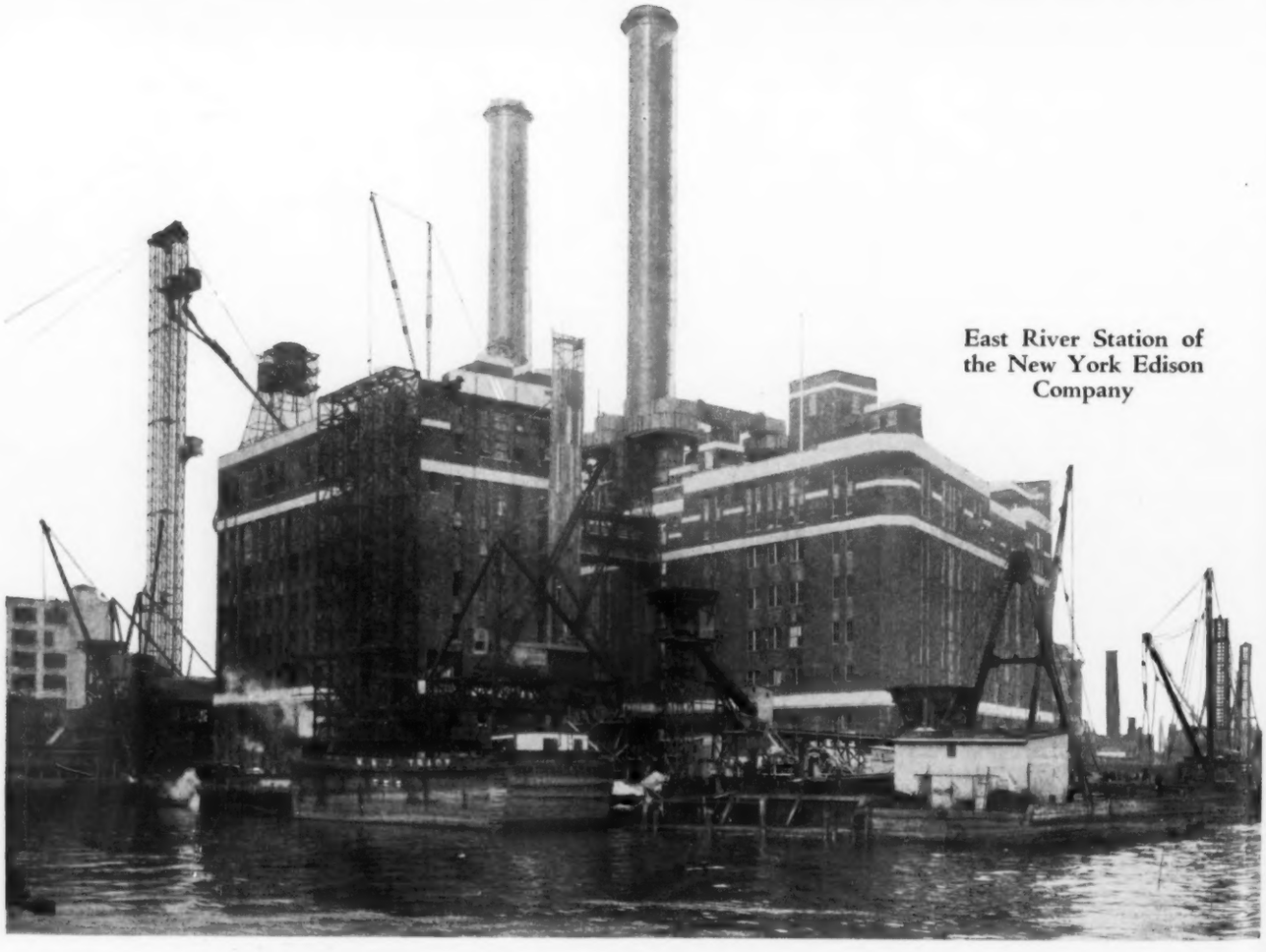


Muscle Shoals Power Can Be Distributed to a Very Large Interconnected System

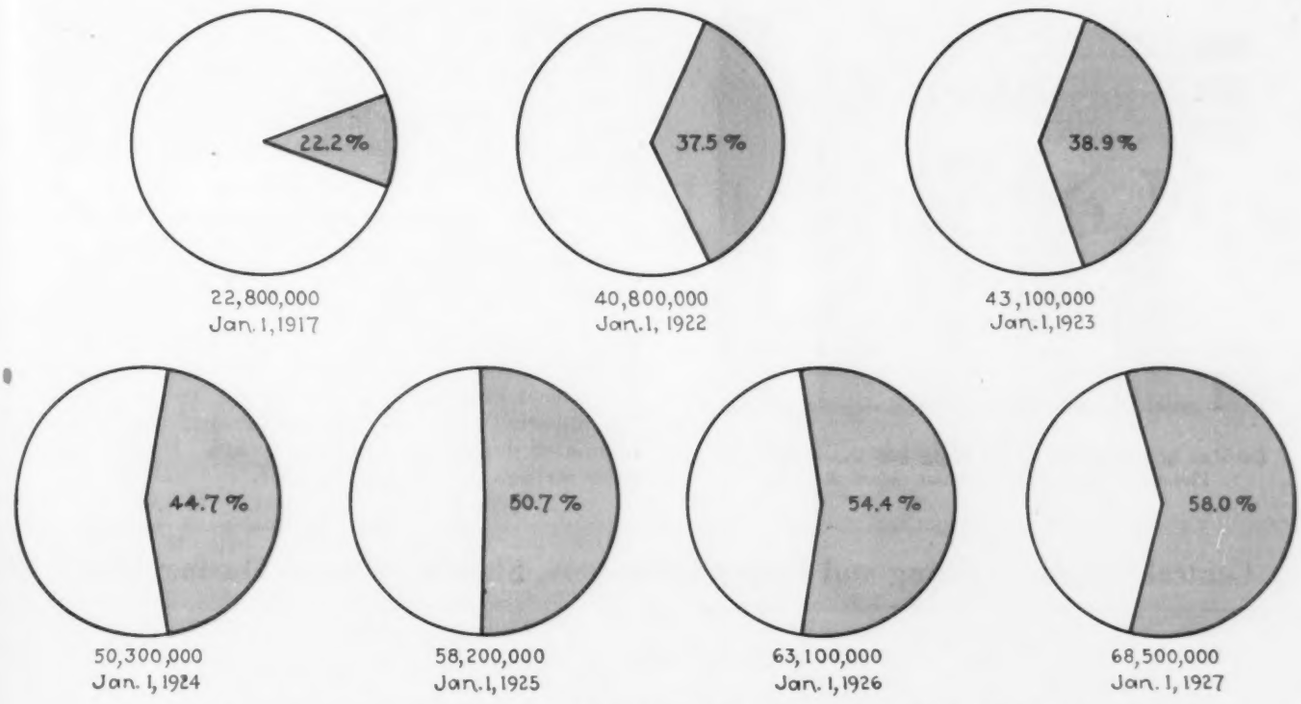
Two New and Highly Economical Stations Built in 1926



Avon Station of the Cleveland Electric Illuminating Company



East River Station of the New York Edison Company



Threefold Increase in Electrically Lighted Homes in a Decade—68,500,000 People Use Electricity in Their Homes—The Percentage of Total Population Is Indicated on Graphs

1,460,360 New Customers in 1926

Light and Power Industry Now Serves a Total of 19,528,581 Customers—Residential Customers Number 15,923,060—Rate of Residential Customer Growth 8.3 per Cent—Saturation Evident in Some Localities

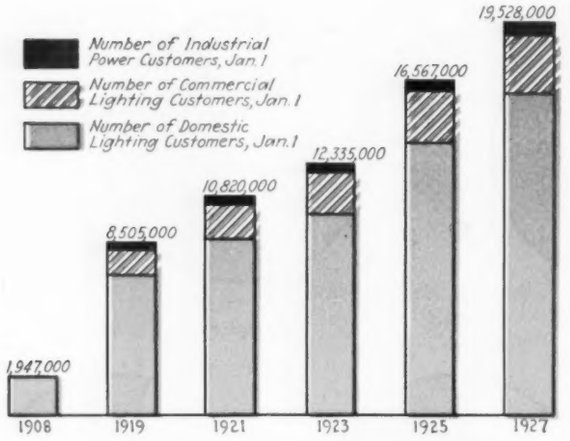
A NET gain of 1,460,360 new customers, 1,222,550 of them residential, is the record growth during the year 1926 as estimated on the basis of reports from all parts of the country. This means that central-station energy is now supplied to 19,528,581 individuals or corporations, and that 15,923,060, or in round numbers close to 16,000,000, homes are electrically lighted, not including the very considerable number of isolated farms, hotels and other establishments served by private plants and therefore not included in the present survey.

Compared with last year's figures, which as revised according to the most recent information indicate a total gain of 1,501,617 customers, 1,293,733 being residential, the year 1926 shows a slight decrease in the rate of growth. In the case of residential customers it amounts to 5.5 per cent. The revision has in a few instances led to apparent inconsistencies in state totals, compared with totals previously given for Jan. 1, 1926. In those cases the actual increase, as heretofore published, should govern.

While on the whole the increase has been less than in 1925, certain regions show a larger rather than a smaller gain. The expansion was particularly marked in the Middle Atlantic States, where it amounted to more than 480,000, which is in excess of 10 per cent of the number at the beginning of the year. Of these more than 260,000 are in New York and 115,000 in New Jersey. These figures are strongly influenced by the metropolitan area, which includes 75 per cent of the New York State customers and in which the gain was well above 15 per cent. The same thing happened on the New Jersey side of the line. The estimates are based on reports covering 78 and 80 per cent respectively of the customers in the two states.

The increase appears to have extended along the entire Eastern coast, the South Atlantic States also reporting decidedly larger gains than in 1925. It also extended into the industrial parts of the East South Central division, where, however, it was in part masked by the slower growth in the agricultural portions.

In the North Central States the companies serving the industrial centers showed gains ranging in the main between 7 and 8 per cent, and here again the regional average was reduced by the more moderate growth in the smaller communities.



Division of Customers in the Light and Power Industry. Domestic Customers Increase Most Rapidly

The other section reporting a growth materially in excess of that for 1925 is the Pacific Coast group of states, particularly California, where the estimated increase, based on reports of companies having 83 per cent of the total number in the state, amounts to 109,745, or 7.35 per cent, and exceeds the increase, as reported last year, by 18,000.

BUILDING CONSTRUCTION CONTINUES

Earlier in the year the belief was expressed that the "building boom," to which was ascribed the major part of the remarkable gains in 1923, 1924 and 1925, had about run its course, and that 1926 would show a decidedly smaller growth than was recorded in those years. The almost hectic activity in the construction industry had apparently met in full the housing deficiency accumulated during the preceding years. In the view of many writers, it had gone further.

Central Station Lighting and Power Customers, Showing Growth During 1926

State	Total Central Station Energy Customers			Domestic Lighting Customers			Commercial Lighting Customers			Power Customers		
	Jan. 1, 1926	Jan. 1, 1927	New Customers Added During 1926	Jan. 1, 1926	Jan. 1, 1927	New Customers Added During 1926	Jan. 1, 1926	Jan. 1, 1927	New Customers Added During 1926	Jan. 1, 1926	Jan. 1, 1927	New Customers Added During 1926
United States	18,968,221	19,528,581	1,460,360	14,700,510	15,923,060	1,222,550	2,735,661	2,920,501	184,840	632,050	685,020	52,970
New England	1,558,777	1,681,877	123,100	1,274,154	1,377,784	103,630	230,508	246,598	16,090	54,115	57,495	3,380
Middle Atlantic	4,640,690	5,123,730	483,040	3,772,550	4,184,900	412,350	730,970	786,150	55,180	137,170	152,680	15,510
South Atlantic	1,191,136	1,315,326	124,190	956,061	1,059,261	103,200	191,789	208,599	16,810	43,286	47,466	4,180
East North Central	4,607,038	4,914,743	307,705	3,824,823	4,088,623	263,860	648,965	685,120	36,155	133,250	140,940	7,690
West North Central	1,927,729	2,044,339	117,210	1,558,764	1,654,944	96,180	298,930	314,685	15,755	69,435	74,710	5,275
East South Central	591,230	643,390	52,160	475,800	518,450	42,650	97,870	105,110	7,240	17,560	19,830	2,270
West South Central	1,005,207	1,078,967	73,760	821,297	882,667	61,370	147,810	157,250	9,440	36,100	39,050	2,950
Mountain	560,939	588,589	27,650	465,991	489,141	23,150	72,689	75,964	3,275	22,259	23,484	1,225
Pacific	1,986,075	2,137,620	151,545	1,551,070	1,667,230	116,160	316,130	341,025	24,895	118,875	129,365	10,490
New England												
Maine	144,220	151,080	6,860	114,800	119,960	5,160	21,370	22,330	960	8,050	8,790	740
New Hampshire	80,380	86,140	5,760	63,200	67,940	4,740	13,830	14,770	940	3,350	3,430	80
Vermont	62,210	65,530	3,320	51,500	54,180	2,680	7,780	8,370	590	2,930	2,980	50
Massachusetts	816,208	889,538	73,330	669,900	730,860	60,960	121,408	132,208	10,800	24,900	26,470	1,570
Rhode Island	130,889	144,739	13,850	109,054	120,544	11,490	18,350	20,180	1,830	3,485	4,015	530
Connecticut	324,870	344,850	19,980	265,700	284,300	18,600	47,770	48,740	970	11,400	11,810	410
Middle Atlantic												
New York	2,316,950	2,577,560	260,610	1,855,050	2,080,350	225,300	406,000	436,180	30,180	55,900	61,030	5,130
New Jersey	807,370	922,640	115,270	659,000	751,260	92,260	126,000	143,640	17,640	22,370	27,740	5,370
Pennsylvania	1,516,370	1,623,530	107,160	1,258,500	1,353,290	94,790	198,970	206,330	7,360	58,900	63,910	5,010
South Atlantic												
Delaware	28,750	31,870	3,120	22,350	25,050	2,700	5,560	5,910	350	840	910	70
Maryland	213,985	236,415	22,430	180,700	200,950	20,250	28,650	30,430	1,780	4,635	5,035	400
District of Columbia	105,911	117,661	11,750	85,500	94,990	9,490	15,785	17,535	1,750	4,626	5,136	510
Virginia	151,830	168,440	16,610	127,200	140,950	13,750	16,380	18,280	1,900	8,250	9,210	960
West Virginia	124,085	134,655	10,570	96,936	105,756	8,820	22,784	24,154	1,370	4,365	4,745	380
North Carolina	180,460	195,460	15,000	137,700	149,270	11,570	35,000	37,770	2,770	7,760	8,420	660
South Carolina	91,180	96,550	5,370	71,600	75,820	4,220	16,630	17,610	980	2,950	3,120	170
Georgia	138,135	154,265	16,130	109,975	123,875	13,900	22,600	24,250	1,650	5,560	6,140	580
Florida	156,800	180,010	23,210	124,100	142,600	18,500	28,400	32,660	4,260	4,300	4,750	450
East North Central												
Ohio	1,188,863	1,275,358	86,495	1,009,673	1,085,398	75,725	153,660	163,640	9,980	25,530	26,320	790
Indiana	520,075	560,405	40,330	435,100	468,600	33,500	65,405	69,785	4,380	19,570	22,020	2,450
Illinois	1,580,650	1,679,680	99,030	1,298,500	1,383,000	84,500	240,100	252,040	11,940	42,050	44,640	2,590
Michigan	864,100	917,965	53,865	722,950	770,850	47,900	116,300	122,115	5,815	24,850	25,000	150
Wisconsin	453,350	481,335	27,985	358,600	380,835	22,235	73,500	77,540	4,040	21,250	22,960	1,710
West North Central												
Minnesota	429,262	450,427	21,165	346,112	363,762	17,650	65,300	67,780	2,480	17,850	18,885	1,035
Iowa	366,965	386,875	19,910	292,160	309,100	16,940	59,580	61,850	2,270	15,225	15,925	700
Missouri	529,120	577,150	48,030	427,900	468,120	40,220	87,000	93,000	6,000	14,220	16,030	1,810
North Dakota	54,547	56,617	2,070	42,567	44,107	1,540	9,800	10,230	430	2,180	2,280	100
South Dakota	64,625	66,320	1,695	50,625	51,685	1,060	10,300	10,815	515	3,700	3,820	120
Nebraska	186,770	195,550	8,780	152,800	159,980	7,180	26,350	27,400	1,050	7,620	8,170	550
Kansas	295,840	311,400	15,560	246,600	258,190	11,590	40,600	43,610	3,010	8,640	9,600	960
East South Central												
Kentucky	200,510	212,030	11,520	158,100	166,800	8,700	33,900	35,360	1,460	8,510	9,870	1,360
Tennessee	202,440	220,090	17,650	169,100	184,660	15,560	29,800	31,710	1,910	3,540	3,720	180
Alabama	131,450	150,980	19,530	104,100	119,820	15,720	24,200	27,470	3,270	3,150	3,690	540
Mississippi	56,830	60,290	3,460	44,500	47,170	2,670	9,970	10,570	600	2,360	2,550	190
West South Central												
Arkansas	111,697	120,842	9,145	91,217	98,517	7,300	17,150	18,725	1,575	3,330	3,600	270
Louisiana	127,210	131,420	4,210	98,050	100,990	2,940	23,960	24,920	960	5,200	5,510	310
Oklahoma	189,800	209,815	20,015	150,300	165,780	15,480	29,600	32,650	3,050	9,900	11,385	1,485
Texas	576,500	616,890	40,390	481,730	517,380	35,650	77,100	80,955	3,855	17,670	18,555	885
Mountain												
Montana	78,610	81,550	2,940	62,550	64,740	2,190	12,610	13,030	420	3,450	3,780	330
Idaho	64,275	67,425	3,150	50,800	53,490	2,690	11,500	11,860	360	1,975	2,075	100
Wyoming	32,040	33,625	1,585	27,400	28,850	1,450	3,360	3,445	85	1,280	1,330	50
Colorado	182,820	194,675	11,855	150,900	161,070	10,170	22,990	24,300	1,310	8,930	9,305	375
New Mexico	24,050	25,690	1,640	19,700	21,120	1,420	3,400	3,570	170	950	1,000	50
Arizona	40,348	41,908	1,560	33,211	34,411	1,200	5,207	5,467	260	1,930	2,030	100
Utah	122,346	126,976	4,630	107,800	111,680	3,880	11,382	11,942	560	3,164	3,354	190
Nevada	16,450	16,740	290	13,630	13,780	150	2,240	2,350	110	580	610	30
Pacific												
Washington	325,300	351,810	26,510	263,500	284,850	21,350	46,000	50,370	4,370	15,800	16,590	790
Oregon	171,205	186,495	15,296	139,900	151,930	12,030	23,630	25,970	2,340	7,675	8,595	920
California	1,489,570	1,599,315	109,745	1,147,670	1,230,450	82,780	246,500	264,685	18,185	95,400	104,180	8,780

However, as compared even with conditions existing so recently as ten years ago, there has been an extraordinary increase in individual wealth. The same factors that enabled countless families to purchase automobiles, radio sets and other articles not long ago regarded as luxuries for the few have similarly affected their ability to live in better homes. Buildings still structurally sound rapidly became obsolete. Apartment houses sprang up not sporadically but by thousands. In the suburbs farms were bought up, laid out in subdivisions and transformed into towns almost overnight. North, East, South and West this process has gone on, not only in the great cities, where the growth both upward and outward has been unprecedented, but also in the smaller communities where, considered on a percentage basis, the development has in many instances been almost as remarkable.

Rate of Increase Decreasing

Further, it must be recalled that building construction figures are generally reported in terms of permits granted or contracts awarded. These measure not completed but prospective structures. The application for electrical service, on the contrary, does not come until the occupant is ready to move in or has actually moved in. It is one of the last stages in the process. Consequently a decrease in building activity as indicated by permits or contracts is not reflected as decreased growth in the number of central-station customers for many months.

That the rate of increase in number of new customers recorded for the past three years can continue indefinitely is doubtful. It is true that the normal growth of population would in itself account for 1.5 per cent a year. Moreover, there has been a continuous drift from country to city, a drift that will continue so long as high wages rule in industry while the farmer feels that his labor is insufficiently rewarded. The increasing wealth per capita has apparently brought about the construction of more new buildings than would be justified merely by the needs of the population on the basis of 1913 standards.

Almost fifty million of our people are still without the convenience of central-station service. Many industrial establishments are as yet only potential customers. Moreover, new uses for electrical energy are constantly being found.

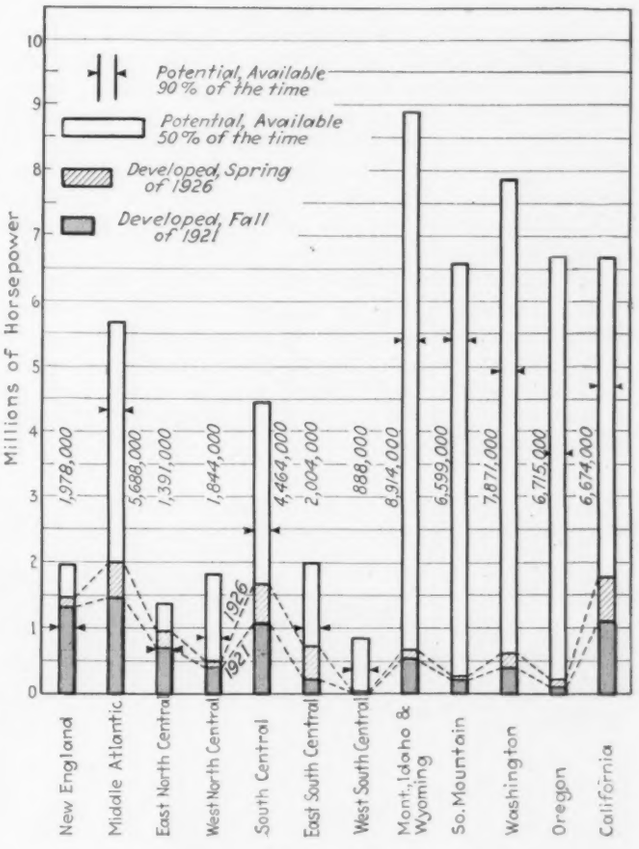
Those are some of the favorable factors. On the negative side certain restraining conditions must be recognized, suggesting the probability of slower progress in the future. Building activity is believed to have passed its peak. Caution is being urged against the dangers of overbuilding. The homes in our cities are now quite generally wired. Electricity is taken for granted almost like running water, and old houses that have not been wired by this time must in the main be poor prospects. The population having central-station service, estimated on the assumption of 4.3 persons to the average family, already includes 58 per cent of the nation and thus exceeds the urban population living in towns of 2,500 or over, who constitute, according to the last census, less than 52 per cent.

It seems clear, therefore, that the opportunities for the central station, at least so far as residential customers are concerned, lie less in the direction of increasing their number than in the direction of greater use of energy per consumer through the increasing use of electrical appliances.

Water-Power Development

11,176,596 Hp.

A Third of the Available Power in the United States Now Harnessed—83 per Cent in Public Utility Plants



Undeveloped Power Chiefly in the West

THE chief water-power resources still awaiting development are in the Rocky Mountain and Pacific States. That is shown by data supplied to the ELECTRICAL WORLD by the United States Geological Survey showing the water power situation as it existed in the spring of 1926.

In the New England States the development already exceeds the power available 90 per cent of the time and comes within a quarter of that potentially available during half the days of the year. Maine still presents possibilities, but in the other states little remains to be done.

In the Middle Atlantic States the only important sites still undeveloped or but partially utilized are confined to Niagara and the St. Lawrence River. In the South Atlantic division new installations have been going in

at the rate of over a hundred thousand horsepower a year, and at that rate another decade will see the total amount to a figure exceeding the continuously available resources and well along toward the exploitation of the 50 per cent flow. However, even there another million or more is in sight, and as the heads are not high some big installations are to be expected during the coming years.

South Expands Rapidly

The other Eastern section in which important new installations are still possible is the East South Central States, and there progress has been rapid. In Alabama alone the increase during the year exceeded 300,000 hp. About two-thirds of the 90 per cent power has been developed, leaving some 300,000 hp. still remaining, but as many of the existing plants are on streams with very widely fluctuating flow and by no means in the 90 per cent class, another million may be anticipated, at least. Considering the fast-growing needs of the South, however, much of the future increase in central-station capacity must continue to take the form of steam plants.

The great Mississippi Valley region is relatively poor in potential sites and so can never contribute much to the national total. There remain the Mountain and Pacific States, richest part of the country in hydraulic possibilities, but at present containing scarcely a tenth of our population though occupying over a third of the area. These states already show a higher average of energy generated per capita than any other section. Even there occasional acute deficiencies in stream flow have demonstrated the urgent necessity of backing up hydro developments with liberal reserves in the form of steam plant. It is the region of greatest possibilities in water-power development.

Comparison of the data for public utility plants, which term includes railway power houses as well as central stations for light and power, with figures for manufacturing plants reveals interesting differences in different parts of the country. In New England the latter predominate as to number and as to total horsepower. They were installed before the central station came into existence and are waning but slowly in relative importance. In other regions, most conspicuously in the West, where developments must be made on a large scale if made at all, and where the main influx of population is comparatively recent, more than 96 per cent of the water power is in public utility plants.

Looking to the future, it is evident that the more accessible and readily developed sites will be, in general, the first to be developed. As time goes on the unit costs are therefore likely to increase, the necessary transmission distances to lengthen, and the need of reserve capacity in the form of fuel stations, in order to furnish uninterrupted service during periods of low water, to become more insistent; meanwhile the over-all efficiency of steam stations is constantly being improved, and the economic competition to be met by water power is thereby intensified. Notwithstanding the very real desirability of hydro-electric development as a matter of conservation and effective utilization of our natural resources, it is necessary that the situation be recognized in its broad aspects, not so much by the electric light and power industry—there is nothing new to the industry in these statements—but by the general public, which still seems to be under the impression that electricity can be produced from water power for nothing. The heavy investment required, and the consequent burden of fixed charges to be borne by a hydraulic development, are not always appreciated.

Hydro Capacity Now 11,176,596 Hp.

Customer-Ownership Sales Nearly $247,000,000

Sales in All Parts of the Country Will Exceed 3,140,000 Shares — Aggregate Transactions 396,400—17.7 per Cent of New Capital Has Been Invested Directly by Customers

IN COMMON with practically all other activities of the central-station industry, the number of shares of stock sold directly to customers was greater in 1926 than in 1925, but the value, stated in par, was lower by $50,000,000.

The estimated amounts, based on monthly reports received by the ELECTRICAL WORLD during the first ten months of the year from companies participating in the customer-ownership movement, are 396,420 sales, comprising 3,143,240 shares, valued at $246,900,000. This constitutes 17.7 per cent of the industry's total financing for the year. In 1925 the corresponding proportion was 23.2 per cent.

Security Sales 1920-1926, Inclusive

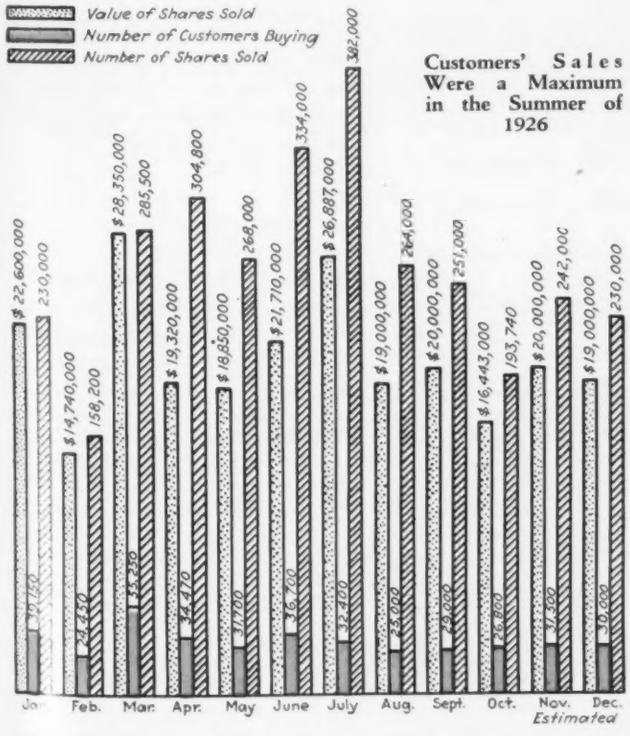
	Sales by Investment Houses	Sales Direct to Customers	Per Cent Direct to Customers
1920	$326,374,000	$43,000,000	11.7
1921	458,917,000	80,000,000	14.8
1922	589,961,000	130,000,000	18.1
1923	747,722,000	175,000,000	19.0
1924	982,421,000	254,000,000	20.6
1925	982,223,000	297,561,800	23.2
1926	1,142,665,000†	246,900,000*	17.7
Total 1920-1926	$5,230,283,000	$1,226,461,800	19.0

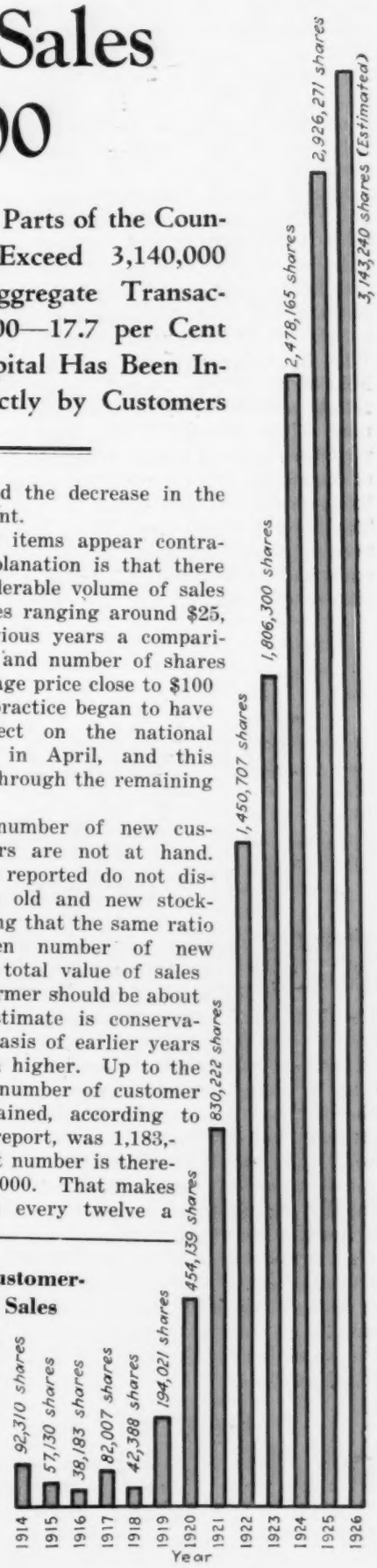
*November and December estimated. †Last week of December estimated.

Compared with the 1925 sales as reported by the customer-ownership committee of the National Electric Light Association, the increase in number of shares sold is 7 per cent and the decrease in the value is 16 per cent.

The two latter items appear contradictory. The explanation is that there has been a considerable volume of sales of shares at prices ranging around $25, whereas for previous years a comparison of the value and number of shares indicates an average price close to $100 per share. The practice began to have a noticeable effect on the national monthly figures in April, and this effect continued through the remaining months.

Data on the number of new customer stockholders are not at hand. The transactions reported do not distinguish between old and new stockholders. Assuming that the same ratio prevailed between number of new stockholders and total value of sales as in 1925, the former should be about 200,000. The estimate is conservative, for on the basis of earlier years it would be much higher. Up to the end of 1925 the number of customer shareholders obtained, according to the committee's report, was 1,183,410. The present number is therefore about 1,380,000. That makes one customer in every twelve a





stockholder in his local company. Analyses of the sales by months in 1925 and 1926 show very erratic movements. In the former year sales during the first six months were far stronger than during the last six. In 1926 there was no important difference between the two halves, at least through October. In both years January, March and July stand out. Since those months coincide with the dividend and interest dates of many investments, the possibility suggests itself that the purchase of central-station company stock is thereby stimulated. Why the value of shares sold in February, 1926, should have fallen to 60 per cent of the January values, whereas in 1925 they were 88 per cent, or why June sales in one year should be nearly up to those of January, while falling below January by 23 per cent the year before, are questions not answered readily. The irregular movement does, however, point to the need of a serious study of local conditions affecting each individual company's sales, with a view to the discovery of reasons why they should exist, or, in their absence, the development of a system that will bring the sales up during the low months, in so far as such sales are to continue as an element in the industry's financing in the future.

Until 1925 the proportion of new capital raised by customer sales steadily increased. The year 1926 marks a change. The reasons, which lie chiefly in the direction of the more economical raising of funds by the sale of bonds rather than stock, are more fully discussed in the Financial and Corporate section of the ELECTRICAL WORLD.

Utility experience with customer-ownership sales over a period of years have been very satisfactory. Preferred stock issues have been sold in the majority of instances and market values have been very stable. The strong earning position has permitted dividends to be maintained and the public has eagerly invested its savings in the utility securities. The cost of money raised by customer-ownership sales has been reasonable and every indication points to a continuance of the practice.

Holding and Voting Control

I—Equity and Voting Control
II—Business Trends *III—Capital Turnover*

Capital Structure Analysis Shows Financial Strength—Earning Ratio Turns Upward—Unit Measures of Business and Financial Strength of Representative Holding Companies

FINAL decisions as to the place and accomplishments of the holding company in the light and power industry await more data and experience in actual operation. In principle and in many particular cases the holding company has proved an asset, but the full scope of its work on a national basis cannot yet be measured, because the industry is still growing rapidly and because integration and consolidation of properties require a time period to secure full results. As a cross-section of present conditions, however, the following analysis of representative holding companies is thought to be of interest. These companies were selected at random and different groups were chosen for capital-structure analysis and for unit-business-trend analysis.

I—Equity and Voting Control

POWER and light companies have been accused at various times of trading on dangerously thin equities. A critic of the industry stated recently that "of $1,500,000,000 of publicly held securities of twelve major holding companies serving electric light, power, gas and water in the United States in 1925, the equity common stocks, in which are vested the complete control, amount to only 10 per cent of that tremendous total." As a mere generalization, the statement may easily be misconstrued.

In a study made recently by the ELECTRICAL WORLD of the financial position of a group of three power and light holding companies securities were segregated by classes and the following relationships were found to exist:

Securities of Holding Companies:	
Common stock	$162,445,000 or 42 per cent of total
Preferred stock	121,456,000 or 31 per cent of total
Bonds	106,481,000 or 27 per cent of total
	$390,382,000
Securities of Subsidiary Companies:	
Common stock	$138,048,000 or 25 per cent of total
Preferred stock	152,936,000 or 27 per cent of total
Bonds	266,283,000 or 48 per cent of total
	$557,267,000

In arriving at the totals and percentages shown current market value is taken where such value differs materially from book value. It may be assumed that

the difference between book and market value would affect the various classes of securities in such proportion as to give them the correct relationship for purposes of the present analysis. A study of the structural set-up shown gives a clear picture of where the actual control and ownership lie in the case of these companies; holding company common stock represents ownership of 100 per cent of the common of subsidiaries. In one case a block of preferred is also owned by the parent, and adjustment is made for this amount. Control of the entire group lies in the hands of holding company common stock, which is 42 per cent of the capitalization of the parent companies. This 42 per cent ownership represents control of a group of properties of which control is vested in 25 per cent of outstanding securities, so that control of the system is in the hands of 42 per cent of the 25 per cent, or approximately one-thirteenth of the total.

Companies in Strong Earning Position

One of the holding companies in the group chosen presents the following capital picture, in round figures:

Holding Company:	
Common stock	$46,367,000 or 49 per cent of total
Preferred stock	33,683,000 or 36 per cent of total
Bonds	12,770,000 or 15 per cent of total
	$92,820,000
Subsidiary Companies:	
Common stock	$37,106,000 or 16 per cent of total
Preferred stock	80,504,000 or 34 per cent of total
Bonds	117,809,000 or 50 per cent of total
	$235,419,000

The actual position of this company from an earnings standpoint may be analyzed in the following manner, the situation being pictured from the standpoint of the owner of holding company common stock:

Position of Subsidiaries:		
Gross earnings	$44,174,000	
Operating costs	24,922,000	
Depreciation	3,113,000	
Interest and dividends	10,459,000	
Balance available for holding company common		$5,680,000
Position of Holding Company:		
Earnings from subsidiaries	$5,680,000	
Holding company capital requirements		
Preferred dividends	2,189,000	
Bond interest	653,000	
Total	$2,842,000	
Margin available for holding company earnings		$2,838,000
Percentage margin over capital requirements.		50 per cent

The singularly strong position of this holding company, as illustrated above, may be characterized by the following summary:

Subsidiary Companies:	
Percentage equity in capital structure, per cent	16
Voting power in terms of percentage of capital, per cent.	16
Percentage equity in earnings, 100 per cent of	$5,680,000
Dollars per share earned on $100 par basis	$15
Holding Company Structure:	
Percentage equity on capital structure, per cent	48
Voting power in terms of percentage of capital, per cent.	16
Percentage equity in earnings, 100 per cent of	$1,588,000
Dollars per share earned on $100 par basis	$17

In the case of the other companies studied the results of the analysis are similar. One of the companies studied shows an equity in holding company common stock of one-twelfth and the other one of one-sixth in relation to the entire capital structure of parent and subsidiaries. Market value was taken rather than book value in the case of the holding company common. Both companies show an inherently strong and growing earning position, the dividend record over a period of years being more attractive than that of any other comparable group of securities. The bulk of preferred issues of this class have unbroken dividend records. In a few cases dividends have been deferred, but have subsequently been paid off in stock or in cash. Accumulated back dividends unpaid is a classification that does not apply to the power and light stocks.

II—Holding Company Business Trends

THE integration of operating utilities into holding companies has occurred rapidly in the past few years. Such a change is alleged to introduce operating and fixed charge economies and to permit better service to be rendered. Earnings should be increased, capital costs reduced and sales of service augmented.

An attempt has been made to check holding company activities by making an analysis of four large and representative systems with subsidiary properties in many parts of the country. These four groups represent different management and financial interests and thus give a cross-section of the national situation. But there are differences in operating conditions, in territory served and in rate of expansion, which make comparisons in detail of little value. Only trend indications should be noted, and those trends that appear unfavorable now may readjust themselves in time. Many students of the light and power industry fail to realize that time is required for the complete integration of operating properties into a unit that realizes the objects for which the consolidation was made.

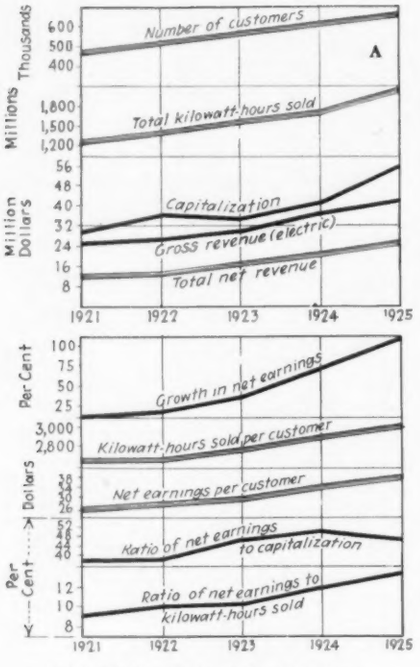
The significant unit in the graphs shown refers to the business done per customer. Any commercial business tries to amplify service per customer and at the same time increase the net earnings per customer. Usually it is necessary to reduce prices to increase consumption and the relative change in price and consumption determines whether net earnings increase or decrease. Energetic sales effort devoted to sales of product to existing customers is another commercial necessity, and unless this is done contemporaneously with aggressive sales efforts to secure new customers the total effect is a dilution of the business.

Thus it may be said that a utility is in a prosperous business condition if earnings per customer and sales of energy per customer increase and the price of the product per unit decreases over a period of years. Its business pulse should be strong and steady if these trends are indicated. On the other hand, if these trends are in the wrong direction, corrective steps should be taken to make them right. But it must be repeated that any utility that has expanded very rapidly or has added many low-consumption customers may realize that trends at present may be wrong and may be building its commercial efforts according to a plan that will correct them.

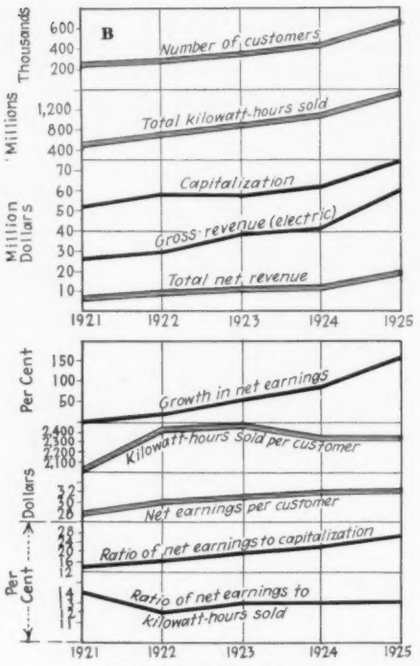
Analysis of Operations

Consequently any analysis of the accompanying graphs should not lead to industry-wide conclusions. The graphs show merely a cross-section at the present time. The necessity for well-directed commercial sales effort is the only positive conclusion, and this will apply to any utility in this country with the present unsaturated markets. But those with bad business trends are under the urge to remedy conditions quickly and positively.

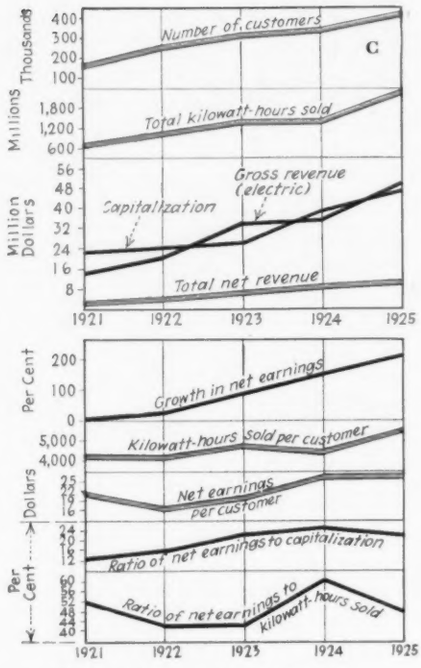
It happens that Company A as shown in the graph



This Utility Is in Splendid Shape



Dilution Is Evident

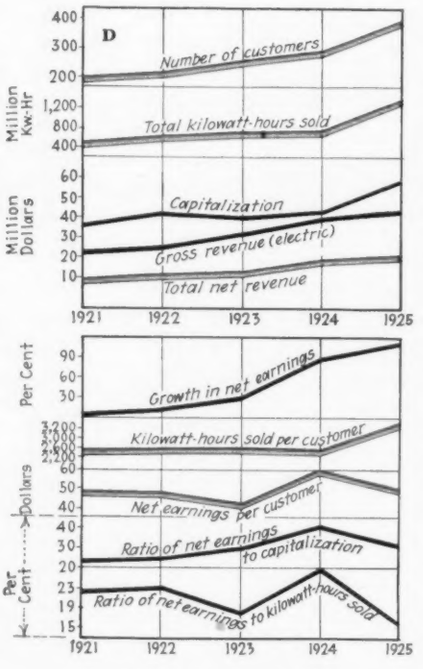


Effect of Expansion Indicated

has most business trends in the right direction. The net earnings are increasing at a rapid rate with years in business, and the earnings per customer, the earnings per unit sold and the units sold per customer all have increased since 1921 and the trend is for a further increase.

This company sells nearly 2,000,000,000 kw.-hr. of energy each year to nearly 600,000 customers. It is nearly all electric light and power business, and the subsidiary properties consist of three large units in widely separated territory and many small properties in several states. Although the larger subsidiary properties have been operating for many years each has expanded rapidly, and the holding company has bought many small properties since 1921. Thus in spite of a rapid expansion of business there has appeared very little dilution of the business. Since 1921 the number of customers has increased 220,000, yet the net earnings in the same period have increased 100 per cent. Only 3,000 kw.-hr. per customer was sold in 1925, which indicates the large number of small-usage customers served. Most of the properties are in non-industrial areas and many of them are in agricultural communities. It speaks well for the commercial program and for management policies to find this holding company in such splendid shape as regards healthy trends in business. Any effect of dilution has been eliminated by wise sales efforts.

Conditions with respect to Company B are not so encouraging, as will be noted on the graphs. This is a very large holding group that operates in widely separated areas, none of which is predominantly industrial. But any conclusions must be modified because this property has expanded very rapidly in the past



This Utility Increased Sales but Not Earnings

two years. It has purchased and consolidated several large operating units in different parts of the country and the effect of dilution should be noticeable.

Since 1923 the kilowatt-hours sold per customer have decreased slightly and the net earnings per customer have remained almost stationary. Also the ratio of total net earnings to kilowatt-hours sold has remained stationary. During this period, however, the net earnings have increased nearly 100 per cent. The thing that has made this possible is the large increase in the number of customers. Nearly 400,000 new customers have been added, and the great effect of customer increase on net earnings is very noticeable from 1924 to 1925. Thus this utility has gained in business by adding new customers rather than by intensifying service to existing customers. As compared with 3,000 kw.-hr. per customer for Company A, it sells only 2,300 kw.-hr. per customer. A necessity for aggressive selling to existing customers is indicated to bring business trends in the proper direction.

The analysis of Company C shows some interesting conditions. This utility during the past two years has taken over several large properties that serve large industrial customers. Total net earnings have increased greatly, and a large increment in number of customers occurred in 1925. Fairly satisfactory earnings per customer and sales per customer existed until the beginning of 1925. The addition of a large property with mostly large industrial customers reduced the earnings per customer, largely increased the kilowatt-hours sold per customer and decreased the ratio of earnings to kilowatt-hours sold. Time for readjustment of the whole system will be required before permanent trends

are established. On the whole, this company has favorable trend curves and a high average of 5,500 kw.-hr. sold per customer. With a predominant industrial load, the necessity for intensive selling to small customers is not indicated by a graph of this type. A graph dealing with residence, commercial lighting and small power business would be necessary before conclusions should be drawn. A feature of the graph is that net earnings increase greatly, even though the ratio of net earnings to kilowatt-hours sold decreases. This shows that volume of product sold can offset a decrease of price in product sold within certain limits.

The graph showing operations of Company D depicts a rapid increase in net earnings since 1923. Before this period conditions were very static, if not on the down grade. But in 1923 and since then this company purchased new properties, reorganized its operations and went after business. It now has about 500,000 customers and sells about 1,300,000,000 kw.-hr. per year. The sales have increased three times and the number of customers twice since 1922. From 1923 to 1924 the trend curves are very favorable, but during 1925, in spite of an increase in kilowatt-hours sold per customer, the net earnings per customer and per unit of product sold have decreased. This has affected the rate of increase in total net earnings.

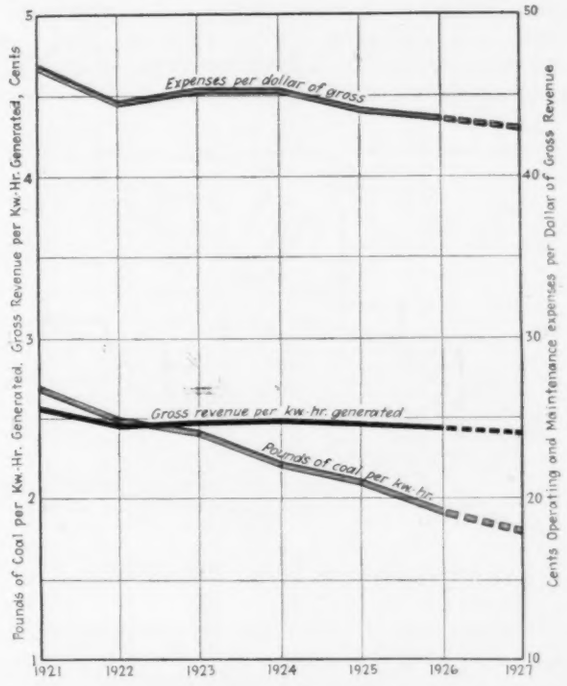
Here again a rapid expansion of system and the acquisition of new properties have affected trend curves. Only a period of the next year or two will permit of conclusions to be made. At present certain trends are in the wrong direction and executive planning of sales efforts is needed to correct conditions.

General Analysis of Groups

Two very interesting curves on the graphs are those of gross revenue and total book value of securities or capitalization. When there is a divergence of capitalization and revenue, the net revenues are decreased; when there is a convergence of these two curves, the net revenue is increased. Again it will be noted that a relation of some sort exists between the magnitude of capitalization and gross revenue. They are about equal for Company C and capitalization exceeds gross revenue the largest amount in Company B. An industry background knowledge might be had that said Company C is the most conservative and Company B the least conservative in this group of four holding companies from the standpoint of capitalization. Therefore the question may be raised but not answered yet: Is an equality between gross revenue and total book value of securities a measure of a conservative financial structure? It may be that a complete study of industry operations may lead to some conclusions regarding this question and develop a relationship somewhat analogous to the five to one investment turn-over ratio so often used.

Apparently operating costs increase directly with magnitude of business, and therefore the effect of capital charges on net is the deciding variable for changes in percentage of net earnings. From one standpoint a maximum amount of low-rate securities is desirable and other capital obligations should then be based on earnings only—that is, bonds and no-par common stock would affect net earnings least. Of course, other elements enter into the formulation of financial structures, and this idea is subject to modification and only warrants investigation and consideration.

Another interesting comparison is found in the ratio of net earnings to kilowatt-hours sold. Three of the companies are in the same range of ratio, but Company C is nearly double the others, despite the fact it serves large industrial loads and therefore should give low prices per unit of product and this in turn should give a low ratio of net to kilowatt-hours. This comparison indicates the fallacy of drawing conclusions for the industry on the basis of an analysis of a few utilities. Again it may be noted that net earnings per customer are not the largest for the holding group serving the industrial area. Large power consumers may be getting very low rates and thus offset the dilution effect.



The Light and Power Industry Has Reduced Costs, Increased Thermal Economies and Decreased the Sales Price of Energy

But a net earning per customer that ranges from $20 to $50 gives a wide gap for analysis to determine fundamental differences.

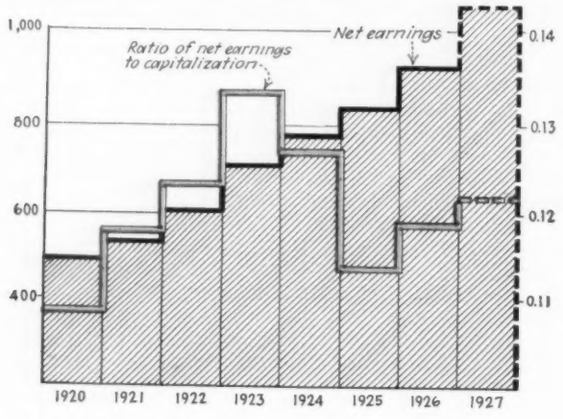
These four holding companies supply about 2,000,000 customers with 6,000,000,000 kw.-hr. of energy per year, and this analysis is merely indicative of conditions during the development at this stage of the business. This is still a period of transition. There is evidently an immediate opportunity for intensifying service per customer.

III—Capital Turnover

THE fact that the earning ratio and the capacity factor of the power and light industry have both shown a tendency to decline since 1923 is taken by some as a danger signal. Looking to the future, it is one of the most favorable features of the present status of the industry. Both have arisen out of the tendency of certain utilities to add larger generating capacity than is immediately required, in order to take care of expected market growth. Similarly, interconnected lines and large transmission systems have been built up to take care of future loads. Most utilities, furthermore, have been rebuilding and increasing service standards very materially. Nearly all heavy capital

expenditures recently made and now under way are directed both to the reduction of operating costs and to the increase of gross revenue. This is especially true of recent water-power developments, most of the more costly high-tension transmission lines and most of the costly so-called super-power steam stations. It is expected that these expenditures will greatly reduce the cost of producing and distributing electrical energy and will extend service facilities into unserved areas. Nearly all of the costs of water-power development are, of course, capital costs, and once the project is completed, there is little further expense. It should therefore follow that there will be a material reduction in the near future in operating ratios and a corresponding increase in net revenue.

The present position of the industry is pictured in the accompanying chart showing the trend of the earning



Utility Earning Ratio Now Upward

ratio. From 1920 to 1923, inclusive, this ratio improved continuously until it reached 0.133. Since that time the program above outlined has been under way and the ratio declined steadily until some time in 1925. Figures just compiled by the ELECTRICAL WORLD indicate a slight improvement in the earning ratio in comparison with the decline of the two and a half previous years. Although it is yet too early to make predictions, this change seems to be the beginning of the realization of greater earnings upon the investment than have already been made. All this has an important financial implication. Were the full capacity of the industry in operation, the earning ratio could not be expected to advance except by a reduction in operating costs. Two factors therefore are operating to increase the ratio between investment and net earnings. Operating costs have been more or less stabilized, and, on the other hand, earnings are increasing rapidly in those cases in which definite sales promotion is adopted to increase market consumption. Some companies have shown rather remarkable examples of what can be done by more intensive exploitation of their particular field.

OPERATING RATIO SHOWS IMPROVEMENT

There has been a gradual improvement during the past year in the operating ratio of the industry. Although operating costs, of course, are mounting year by year, taking the companies in the aggregate, the ratio between operating costs and earnings shows a slight tendency to decrease, showing that earnings are increasing more rapidly than costs. The ratio as shown by utility data stood at 45 in 1922; by 1925 it had reached 43.8, and at the present time it stands at 43.6.

The earning position of the power and light industry will be seen from the following tabulation (000,000 omitted):

	Gross Revenue	Operating Costs	Net Revenue
1922	1,072	482	590
1923	1,270	577	693
1924	1,354	617	737
1025	1,506	661	845
1926	1,684	735	949

Turning to the ratio between gross revenue and capitalization, there is still an apparent falling off in revenue returns per dollar invested, in comparison with the situation five years ago. In 1920 the ratio between investment and revenue was 4.6 to 1; in 1922 it was the same; in 1923 it reached a minimum of 4.1 to 1. At this point a change took place, due to conditions in the industry already referred to, and the capital turn-over became more ponderous. In 1924 the ratio stood at 4.3 to 1; in 1925, 4.5 to 1, and in 1926 4.8 to 1. Statistics just compiled show that the industry has a ratio of 4.9 to 1 as of Jan. 1, 1927, showing that the tendency has continued and that the improvement in the net earnings ratio has not yet made its appearance in gross.

Power Station Building in 1926

Active Construction Adds 2,400,000 Kva.—Two-thirds of a Million in Middle Atlantic States—1,780,000 Steam, 609,000 Water

NEW installations during 1926 amounted to 2,389,167 kva., of which 25.5 per cent was in water power. A very moderate allowance for small plants not reported would bring the total to 2,400,000 kva. In steam, the Middle Atlantic and East North Central States, the great industrial parts of the country, led with a combined total exceeding 1,120,000 kva.; in the western group, 311,500 kva. of water power was put in operation. The largest additions in steam were the Kearny station of the Public Service Electric & Gas Company of New Jersey and the two stations of the Detroit Edison Company. In water power, the Martin Dam station of the Alabama Power Company, the Big Creek of the Southern California Edison Company, the Cheat River of the West Penn Power Company, and the Bear Creek of the Pacific Gas & Electric Company stand out.

Table I—New Installations Completed During 1926

Division	Steam, Kva.	Hydro, Kva.	Total Kva.
New England	.....	19,800	19,800
Middle Atlantic	615,517	64,900	680,417
South Atlantic	227,000	119,000	346,000
East North Central	510,000	4,000	514,000
East South Central	6,000	90,000	96,000
West North Central	59,200	.....	59,200
West South Central	252,250	.....	252,250
Mountain	70,000	38,500	108,500
Pacific	40,000	273,000	313,000
Total	1,779,967	609,200	2,389,167

Table II—Hydro-Electric Generating Plants Completed in 1926, Now Under Construction, or Planned for an Early Start, Including Additions to Existing Installations

Company	Station	Initial or Added Capacity, Hp.	Date of Operation	Ultimate Capacity, Hp.
New England States				
Montpelier and Barre Lt. & Power Co.	Winooski	7,000	1926	.....
Cumberland County Pwr. & Lt. Co.	West Buxton	7,000	1926	.....
New England Public Service Co.	Contoocook	5,000	1926	.....
New England Pwr. Co.	Bellows Falls	45,000	1927	.....
Connecticut Lt. & Pwr. Co.	Rocky River	30,000	1928	.....
New England Pwr. Co.	Sherman Bridge	7,000†	1926	.....
Central Maine Power Co.	Gulf Island	27,000	1927	.....
Middle Atlantic States				
West Penn Pwr. Co.	Cheat River	72,000	1926	.....
Philadelphia Elec. Co.	Conowingo	350,000	1928	700,000
Rochester Gas & Elec. Corp.	Mount Morris	60,000	1927	.....
Oswego River Pwr. Corp.	Oswego	10,000	1926	.....
Northern Adirondack Pwr. Co.	Ausable Chasm	4,500†	1927	.....
Rochester Gas & Elec. Corp.	Lower Falls	20,000	1927	.....
South Atlantic States				
Carolina Pwr. & Lt. Co.	Swift Island	50,000	1927	100,000
Toccoa Pwr. Co.	Toccoa, Ga.	22,000	1929	.....
Georgia Railway & Pwr. Co.	Nacoochee	7,000	1927	.....
Georgia Railway & Pwr. Co.	Burton	9,000	1927	.....
Columbus, Ga. Elec. & Pwr. Co.	Bartlett's Ferry	80,000	1926	.....
Carolina Pwr. & Lt. Co.	Norwood	70,000	1926	90,000
Carolina Pwr. & Lt. Co.	Pigeon River	50,000†	1927	75,000†
Tallasee Pwr. Co.	Badin	40,000	1927	.....
Baker County Pwr. Co., Ga.	Nochaway Creek	2,400	.....	.....
East North Central States				
Wisconsin Public Service Corp.	Sandstone Rapids	5,000	1926	.....
East South Central States				
Louisville Hydro-Electric Co.	Ohio River	108,000	1928	135,000
Alabama Pwr. Co.	Martin Dam	135,000	1926	180,000
Alabama Power Co.	Coosa River (Lock 18)	72,000	1929	180,000
West North Central States				
Northern Elec. Co.	Menominee River	10,000	1927	.....
Interstate Pwr. Co.	Gays Mills, Wisc.	.....	1926	.....
West South Central States				
James F. Robinson, Oklahoma	Grand River	140,000	1931	.....
Mountain States				
Montana Pwr. Co.	Black Eagle Falls	25,000	1927	.....
U. S. Bureau of Reclamation	Minidoka	3,000‡	1927	10,000‡
Pacific Power & Light Co.	Lewiston	10,000†	1927	10,000†
Utah Power & Light Co.	Cutler	30,000†	1926	30,000†
Salt River Valley Water Users Association	Horse Mesa	33,000‡	1927	33,000‡
Salt River Valley Water Users Association	Mormon Flats	8,500‡	1926	14,000†
Pacific States				
Southern California Edison Co.	Big Creek No. 2 A	112,000	1926	.....
Pacific Gas & Elec. Co.	Melones	36,000	1926	.....
City of Seattle	Diablo Canyon	120,000	1928	.....
California-Oregon Pwr. Co.	Bear Creek	90,000	1926	.....
Pacific Gas & Elec. Co.	Tiger Creek	40,000	1928	.....
Shasta Pwr. Corp.	Pitt No. 4	100,000‡	1928	.....
Merced Irrigation District	Exchequer	49,000	1926	.....
Washington Water Pwr. Co.	Chelan	40,000	1927	120,000
Tacoma Municipal	Cushman No. 2	50,000	1927	140,000
Pacific Gas & Elec. Co.	Mokelumne	60,000	1927	.....
San Joaquin Lt. & Pwr. Corp.	Kings River	13,333‡	1927	500,000
Feather River Pwr. Co.	Bucks Creek	60,000	1927	300,000
Los Angeles Municipal	Owens River	47,000	1928	.....
Grays Harbor Railway & Lt. Co.	Cowlits River	60,000	1928	.....
Aberdeen Municipal	Wynooche	16,000	1928	30,000
Northwestern Pwr. & Lt. Co.	Elwha River	17,500	1927	.....
Bureau of Pwr. & Lt., Los Angeles	Haiwee	7,000‡	1927	.....
American River Water & Pwr. Co.	American River No. 1	20,000†	1928	20,000†
American River Water & Pwr. Co.	American River No. 2	20,000†	1928	20,000†
Washington Pulp & Paper Co.	Glines Canyon	13,333‡	1927	13,333‡
Pacific Gas & Elec. Co.	Drum	15,000‡	1927	.....
Pacific Gas & Elec. Co.	Spaulding No. 3	7,000‡	1927	7,000‡
Pacific Gas & Elec. Co.	Spaulding No. 1	8,000‡	1927	.....
Pacific Gas & Elec. Co.	Spaulding No. 2	3,750‡	1928	.....
Turlock Irrigation District	Don Pedro	15,000†	1927	30,000†
Tacoma Municipal	Cushman	60,000‡	1926	.....

† kw. ‡ kva.

List of Power Projects Completed in 1926 or Under Construction Under License from Federal Power Commission as of Nov. 1, 1926

Project No.	Name	Stream	State	Proposed Ultimate Installation, Hp.	Estimated Cost	Scheduled Date of Completion	Hp. Scheduled to Be Put in Operation or Already Placed in Operation 1926	1927	1928
20	Utah Power & Light Co.	Bear River	Idaho	21,000	$2,500,000	7- 1-26	21,000	.....	.....
67	Southern California Edison Co.	San Joaquin	California	545,000	61,152,000	7- 1-35	.....	.....	.....(a)
70	Rock Creek Power Co.	Rock Creek	Montana	1,880	200,000	8- 1-28	.....	.....	1,880
77	Snow Mountain Water & Pwr. Co.	South Eel	California	14,400	6,665,000	7- 1-29	.....	.....	.....(b)
88	Merced Irrigation District	Merced	California	33,000	13,478,000	7- 1-27	.....	33,000	.....
120	Southern California Edison Co.	San Joaquin	California	195,000	13,890,000	12-31-29	.....	.....	.....(c)
137	Pacific Gas & Electric Co.	No. Fk. Mokelumne	California	42,000	8,291,000	12- 1-30	.....	.....	.....(d)
155	Southern Sierras Power Co.	Snow Creek	California	3,750	656,300	12-31-27	.....	3,750	.....(e)
175	San Joaquin Light & Power Corp.	San Joaquin	California	331,200	50,970,000	7- 1-36	.....	38,000	.....
176	Escondido Mutual Water Co.	San Luis Rey	California	1,000	260,000	9- 1-26	360	.....	.....(f)
184	El Dorado Power Co.	So. Fk. American	California	11,000	8,922,319	12-31-28	.....	.....	.....(g)
185	Southern Sierras Power Co.	Lost Cr. et al.	California	4,000	630,000	12-31-27	.....	4,000	.....
201	Town of Petersburg	Crystal Lake	Alaska	1,240	103,500	12-31-25	1,240	.....	.....(h)
233	Mount Shasta Power Corp.	Pit River	California	74,000	10,000,000	12-31-31	.....	.....	.....
271	Arkansas Light & Power Co.	Ouachita	Arkansas	96,000	8,055,000	7- 1-36	.....	.....	.....(i)
280	Wilson, F. M.	Wilder Cr.	California	15	3,000	1- 1-25	15	.....	.....(j)
287	State of Illinois et al.	Fox River	Illinois	5,500	800,000	7- 1-26	5,400	.....	.....
289	Louisville Hydro-Electric Co.	Ohio	Kentucky	135,000	7,400,000	12-31-29	.....	.....	†
309	Clarion River Power Co.	Clarion	Pennsylvania	42,500	6,460,000	9- 1-27	.....	20,500	.....(k)
312	Molybdenum Corp. of America	Red River	New Mexico	530	67,000	7- 1-27	.....	430	.....(l)
338	Nevada Irrigation District	Middle Fk. Yuba and Canyon Cr.	California	150,000	5,100,000	7- 1-34	.....	.....	.....
346	Pike Rapids Power Co.	Mississippi	Minnesota	24,000	2,380,000	7- 1-26	6,600	.....	.....(m)
349	Alabama Power Co.	Tallapoosa	Alabama	180,000	10,000,000	9- 1-26	70,000	.....	.....(n)
375	Humphreys, A. E.	Roaring Fk. Cr.	Colorado	40	8,000	6- 1-26	.....	30	.....(o)
398	Garber, B. A.	Kanatak Creeks	Alaska	330	66,000	7- 1-26	330	.....	.....(j)
404	Carvey, L. H.	Lagoon Creek	Alaska	160	40,000	12-31-26	.....	200	.....(j)
405	Susquehanna Power Co. and Philadelphia Electric Power Co.	Susquehanna	Maryland and Pennsylvania	473,000*	52,200,000	12-31-35	.....	.....	‡
437	Wheeler, E. R.	Reuben Creek	Oregon	16	3,200	10- 1-25	16	.....	.....(j)
451	Humphreys, A. E.	Goose Creek	Colorado	650	157,900	11- 1-27	.....	400	.....
485	Columbus Electric & Power Co.	Chattahoochee	Alabama and Georgia	80,000	6,500,000	12-31-26	44,000	.....	.....
487	Pennsylvania Power & Light Co.	Wallenpaupack	Pennsylvania	54,000	7,730,000	8- 1-28	54,000	.....	.....
533	Horning, Fred A.	Flat Creek	Montana	80	17,900	1- 1-27	.....	80	.....
534	Cyanide Gold Mining Co., Ltd.	Moyie River	Idaho	770	68,250	12- 1-25	770	.....	.....
590	Snow Storm Silver Lead Co.	Callahan Cr.	Montana	600	60,000	1- 1-29	.....	.....	.....
605	Harvey, C. A.	Trib. to Umpqua	Oregon	7	1,400	3- 1-26	7	.....	.....(j)
615	Muncy, W. G.	Kelly's Gulch	California	20	4,000	1- 1-27	.....	15	.....(j)
618	Alabama Power Co.	Coosa River	Alabama	180,000	13,250,000	12-31-28	.....	.....	72,000
619	Feather River Power Co.	Bucks Cr. et al.	California	60,000	7,700,000	6-30-28	.....	.....	60,000
621	Inland Power & Light Co.	Clearwater River	Idaho	10,880	2,000,000	12-31-31	.....	.....	5,440
693	Town of Highlands	Cullasagee River	North Carolina	300	66,000	6-30-27	.....	300	.....
	Totals			2,873,868	$307,855,769		203,738	104,705	139,320

(a) 30,000 hp. previously installed.
(b) Cost includes about 110 miles of transmission line; 10,400 hp. previously installed.
(c) 105,000 hp. previously installed.
(d) Includes 14.5 miles of transmission line.
(e) Cost includes 4.2 miles of transmission line.
(f) 640 hp. previously installed.
(g) 28,000 hp. previously installed.
(h) Cost includes 16 miles of transmission line.
(i) 12,000 hp. previously installed.
(j) Assumed cost based on $200 per horsepower.
(k) 22,000 hp. previously installed.
(l) 100 hp. previously installed.
(m) 17,400 hp. previously installed.
(n) Includes cost of 67,000 hp. of apparatus only.
(o) 10 hp. previously installed; assumed cost based on $200 per horsepower.
* Subsequently announced as 594,000.
† Later stated to be 108,000.
‡ Later stated to be 378,000.

Table III—Steam-Electric Generating Plants Completed in 1926, Now Under Construction, or Definitely Planned for an Early Start, Including Additions to Existing Installations

Company	Station	Initial or Added Capacity, Kva.	Date of Operation	Ultimate Capacity, Kva.
New England States				
Edison Elec. Illum. Co. of Boston	Edgar	60,000	1927	.....
Middle Atlantic States				
Buffalo General Elec. Co.	River Station	66,667	1926	160,000
Public Service Elec. & Gas Co.	Kearny	205,100	1926	410,000
West Penn Pwr. Co.	Springdale	50,000	1926	.....
Duquesne Lt. Co.	Colfax	90,000	1926	.....
New York Edison Co.	East River	130,000	1927	750,000
Jersey Central Pwr. & Lt. Co.	Whippany	20,000	1927	.....
New York Edison Co.	Hell Gate	130,000	1927	.....
Duquesne Lt. Co.	Shippingport	70,000	1928	.....
Brooklyn Edison Co.	Hudson Ave.	90,000	1926	.....
Utica Gas & Elec. Co.	Harloe Point	30,000	1926	150,000
Staten Island Edison Co.	Livingston	17,500	1926	.....
Metropolitan Edison Co.	Susquehanna	30,000	1926	.....
Binghamton Lt., Heat & Pwr. Co.	Johnson City	30,000	1926	.....
Elmira Water, Lt. & Railroad Co.	Elmira	6,000†	1927	.....
United Elec. Lt. Co., Wilmerding	Braddock	6,250	1926	12,500
South Atlantic States				
Florida Pwr. & Lt. Co.	St. Johns	12,000	1926	100,000†
Florida Pwr. & Lt. Co.	New River	60,000	1926	150,000†
Florida Pwr. Corp.	Inglis	30,000	1926	60,000
Florida Public Service Co.	Benson Springs	30,000	1926	75,000
Jacksonville Municipal	Jacksonville	30,000	1927	.....
Tampa Elec. Co.	Tampa	15,000	1926	.....
Virginia Elec. & Pwr. Co.	Norfolk	30,000	1926	.....
Consolidated Gas, Elec. Lt. & Pwr. Co.	Gould St., Balt.	40,000†	1926	.....
Potomac Elec. Pwr. Co.	Bennings	35,000	1927	.....
East North Central States				
Detroit Edison Co.	Trenton Channel	125,000	1926	300,000
Detroit Edison Co.	Marysville	37,500	1926	.....
Cleveland Elec. Illum. Co.	Avon	75,000	1926	300,000
Columbus Railway Pwr. & Lt. Co.	Pickaway	65,000	1926	150,000
Northern States Pwr. Co.	Island	20,000	1926	.....
Illinois Pwr. & Lt. Corp.	Venice	32,500	1926	.....

Developed and Potential Water

Developed Water Power in the United

	Number of Plants, March 1, 1926			Capacity in Horsepower, March 1, 1926			Capacity in Horsepower, March 1, 1925		
	Total	Public Utility and Municipal	Manufacturing and Miscellaneous	Total	Public Utility and Municipal	Manufacturing and Miscellaneous	Total	Public Utility and Municipal	Manufacturing and Miscellaneous
United States	3,355	1,678	1,677	11,176,596	9,259,972	1,916,624	10,037,655	8,287,332	1,750,323
New England	1,217	259	958	1,485,218	728,999	756,219	1,398,803	656,270	742,533
Middle Atlantic	618	398	220	1,995,289	1,672,496	322,793	1,948,449	1,624,316	324,133
East North Central	342	225	117	978,561	755,370	223,191	884,760	661,445	223,315
West North Central	194	140	54	524,562	425,063	99,499	514,753	414,692	100,061
South Atlantic	341	160	181	1,697,074	1,319,976	377,098	1,589,304	1,352,478	236,826
East South Central	61	46	15	750,253	733,431	16,822	396,791	379,683	17,108
West South Central	29	19	10	31,721	29,016	2,705	31,317	27,105	4,212
Mountain	244	189	55	980,822	959,531	21,291	937,078	915,737	21,341
Pacific	309	242	67	2,733,096	2,636,090	97,006	2,336,400	2,255,606	80,794
New England									
Maine	249	76	173	497,009	193,870	303,139	476,627	174,662	301,965
New Hampshire	243	61	182	272,002	138,461	133,541	243,310	119,740	123,570
Vermont	195	65	130	193,157	149,501	43,656	167,816	114,701	53,115
Massachusetts	347	32	315	344,439	162,477	181,962	344,439	162,477	181,962
Rhode Island	59	5	54	30,188	3,285	26,903	30,188	3,285	26,903
Connecticut	124	20	104	148,423	81,405	67,018	136,423	81,405	55,018
Middle Atlantic									
New York	535	346	189	1,750,391	1,442,783	307,608	1,713,551	1,404,603	308,948
New Jersey	34	10	24	18,902	8,658	10,244	18,902	8,658	10,244
Pennsylvania	49	42	7	225,996	221,055	4,941	225,996	221,055	4,941
East North Central									
Ohio	24	17	7	29,490	27,406	2,084	29,570	24,486	5,084
Indiana	25	17	8	56,476	52,666	3,810	51,276	47,711	3,565
Illinois	31	16	15	94,202	77,277	16,925	86,679	69,759	16,920
Michigan	107	87	20	352,204	301,391	50,813	304,520	255,348	49,172
Wisconsin	155	88	67	446,189	296,630	149,559	412,715	264,141	148,574
West North Central									
Minnesota	63	39	24	267,452	186,285	81,167	262,786	185,664	77,122
Iowa	48	38	10	179,175	177,369	1,806	177,280	175,010	2,270
Missouri	7	5	2	20,560	20,260	300	19,970	19,670	300
North Dakota	1	0	1	245	0	245	245	0	245
South Dakota	9	5	4	19,671	7,050	12,621	19,171	7,050	12,121
Nebraska	43	38	5	20,545	19,742	803	20,837	17,437	3,400
Kansas	23	15	8	16,914	14,357	2,557	14,464	9,861	4,603
South Atlantic									
Delaware	3	0	3	1,161	0	1,161	3,133	0	3,133
Maryland	15	4	11	37,875	33,825	4,050	7,230	2,120	5,110
District of Columbia	3	0	3	970	0	970	666	0	666
Virginia	63	33	30	138,640	97,026	41,614	117,869	90,727	27,142
West Virginia	11	6	5	21,119	11,014	10,105	14,711	8,446	6,265
North Carolina	121	46	75	538,289	269,607	268,682	534,600	379,600	155,000
South Carolina	58	31	27	514,428	486,321	28,107	507,215	482,215	25,000
Georgia	63	37	26	435,822	413,533	22,289	394,794	380,720	14,074
Florida	4	3	1	8,770	8,650	120	9,086	8,650	436
East South Central									
Kentucky	6	3	3	34,255	33,351	904	1,256	352	904
Tennessee	31	24	7	174,175	172,920	1,255	166,347	165,381	966
Alabama	24	19	5	541,823	527,160	14,663	229,188	213,950	15,238
Mississippi	0	0	0	0	0	0	0	0	0
West South Central									
Arkansas	4	4	0	15,550	15,550	0	15,549	15,080	469
Louisiana	0	0	0	0	0	0	0	0	0
Oklahoma	4	4	0	1,948	1,948	0	1,948	1,948	0
Texas	21	11	10	14,223	11,518	2,705	13,820	10,077	3,743
Mountain									
Montana	31	29	2	376,040	374,100	1,940	360,040	358,100	1,940
Idaho	50	43	7	319,437	316,335	3,102	298,837	297,887	950
Wyoming	10	9	1	10,388	10,062	326	7,886	7,560	326
Colorado	61	32	29	95,094	84,456	10,638	90,536	77,696	12,840
New Mexico	7	7	0	1,594	1,594	0	1,455	1,455	0
Arizona	8	8	0	49,360	49,360	0	49,360	49,360	0
Utah	67	52	15	115,274	110,289	4,985	115,329	110,344	4,985
Nevada	10	9	1	13,635	13,335	300	13,635	13,335	300
Pacific									
Washington	74	68	6	656,407	630,590	25,817	560,693	549,746	10,947
Oregon	83	49	34	241,709	189,602	52,107	244,227	193,462	50,765
California	152	125	27	1,834,980	1,815,898	19,082	1,531,480	1,512,398	19,082

*Maryland and District of Columbia. †Data supplied by United States Geological Survey.

Table III—Steam-Electric Plants, Completed, Under Construction or Planned (Concluded)

Company	Station	Initial or Added Capacity, Kva.	Date of Operation	Ultimate Capacity, Kva.
Milwaukee Elec. Ry. & Lt. Co.	Lakeside	80,000	1926	.....
Western United Gas & Elec. Co.	Aurora, Ill.	50,000	1926	.....
State Line Generating Co.	State Line.	220,000	1927	1,000,000
Indiana & Michigan Elec. Co.	Twin Branch	40,000	1927	.....
Commonwealth Edison Co.	Crawford Ave.	200,000	1927	450,000
Ohio Public Service Co.	Ashland	70,000	1927	.....
Ohio Edison Co.	Mad River	25,000	1926	.....
Detroit Edison Co.	Delray No. 3	100,000†	1928	400,000†
East South Central States				
Kentucky Elec. Pwr. Corp.	Nortonville	6,000	1926	.....
Nashville Railway & Lt. Co.	Nashville	20,000	1927	.....
West North Central States				
Kansas Pwr. & Lt. Co.	Tecumseh	16,700	1926	35,000†
Iowa Pwr. & Lt. Co.	Ball's Ford	32,500	1926	.....
Interstate Pwr. Co.	Dubuque	10,000	1926	.....
Empire District Elec. Co.	Riverton	30,000	1927	.....
West South Central States				
Texas Pwr. & Lt. Co.	Trinidad	50,000.	1926	175,000
Oklahoma Gas & Elec. Co.	Harrah	25,000	1926	50,000
Southwestern Gas & Elec. Co.	Shreveport, La.	50,000	1926	.....
Southwestern Lt. & Pwr. Co.	Lawton, Okla.	6,000	1926	.....
Houston Lt. & Pwr. Co.	Deepwater	32,500	1926	.....
Southwest Pwr. Co.	McAlester	10,000	1926	.....
Texas Central Pwr. Co.	San Antonio	7,500	1926	.....
Comal Pwr. Co.	New Braunfels	30,000	1926	120,000
Panhandle Pwr. & Lt. Co.	Panhandle	10,000	1926	.....
Southwestern Public Service Co.	Amarillo, Tex.	5,000†	.....	50,000
Gulf States Utilities Co.	Neches River	25,000†	1926	300,000†
Mountain States				
Public Service Co. of Colorado	Valmount	50,000†	1926	.....
Trinidad Elec. Trans., Ry. & Gas Co.	Trinidad	1,500	1926	.....
Albuquerque Gas & Electric Co.	Bernalillo Steam Plant	3,000†	1927	.....
Pacific States				
Southern California Edison Co.	Long Beach	60,000	1927	300,000
Portland Elec. Pwr. Co.	Station L	22,500	1926	.....
San Diego Consolidated Gas & Elec. Co.	Station B	17,500	1926	60,000†
City of Los Angeles	Los Angeles	30,000	1927	.....
Southern California Edison Co.	Los Angeles	200,000	1927	.....
Central Pwr. & Lt. Co.	San Benito	17,500	.....	.....
City of Pasadena, Calif.	Pasadena Steam Plant	15,000†	1927	.....

† kw.

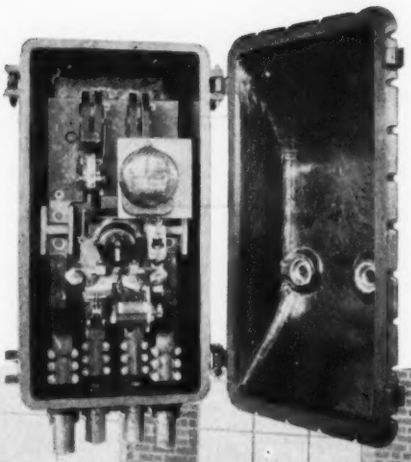
Power in the United States†

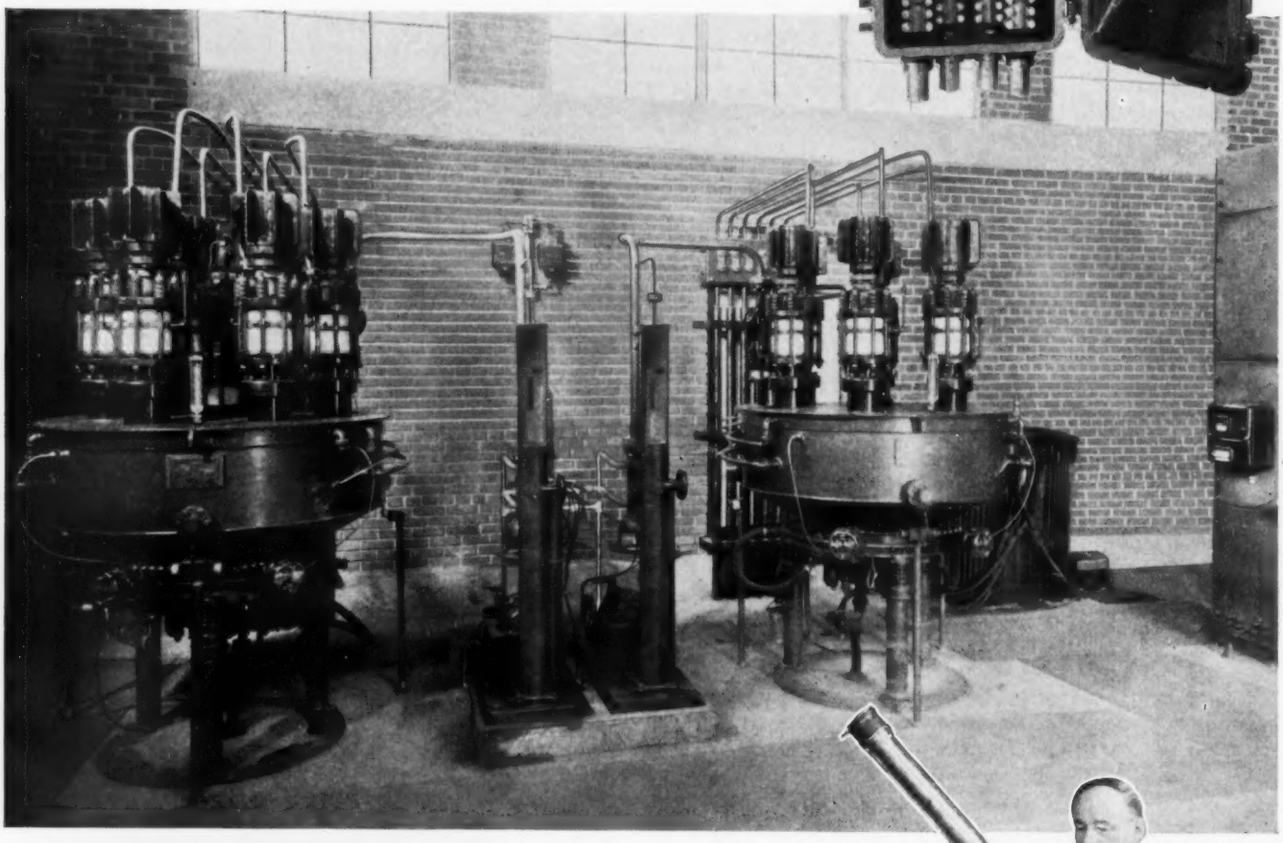
States (Plants of 100 Hp. or More)

Capacity in Horsepower, Mar. 1, 1924			Capacity in Horsepower, Oct. 1, 1921			Potential Water Power Resources of the United States				
						Available 90 per Cent of the Time		Available 50 per Cent of the Time		
Total	Public Utility and Municipal	Manufacturing and Miscellaneous	Total	Public Utility and Municipal	Manufacturing and Miscellaneous	Horsepower	Per Cent	Horsepower	Per Cent	
9,086,958	7,348,197	1,738,761	7,926,958	6,200,380	1,726,578	34,818,000	100.00	55,030,000	100.00	**United States**
1,387,364	644,831	742,533	1,310,507	583,130	727,377	998,000	2.87	1,978,000	3.60	New England
1,731,881	1,408,173	323,708	1,478,904	1,167,539	311,365	4,317,000	12.40	5,688,000	10.35	Middle Atlantic
829,854	625,826	204,028	738,663	542,889	195,774	737,000	2.12	1,391,000	2.53	East North Central
459,736	376,864	82,872	444,396	360,625	83,771	871,000	2.50	1,844,000	3.35	West North Central
1,295,978	1,045,728	250,250	1,076,909	799,767	277,142	2,476,000	7.11	4,464,000	8.11	South Atlantic
345,584	323,816	21,768	245,534	228,380	17,154	1,011,000	2.90	2,004,000	3.64	East South Central
16,727	12,515	4,212	16,274	12,515	3,759	434,000	1.25	888,000	1.61	West South Central
880,783	860,937	19,846	827,101	806,472	20,629	10,736,000	30.83	15,513,000	28.19	Mountain
2,139,051	2,049,507	89,544	1,788,670	1,699,063	89,607	13,238,000	38.02	21,260,000	38.63	Pacific
473,188	171,223	301,965	449,614	156,549	293,065	536,000	1.54	1,074,000	1.95	**New England**
235,810	112,240	123,570	229,305	112,865	116,440	186,000	0.53	350,000	0.64	Maine
167,816	114,701	53,115	129,566	72,651	56,915	80,000	0.23	169,000	0.31	New Hampshire
343,939	161,977	181,962	338,057	157,605	180,452	106,000	0.31	235,000	0.43	Vermont
30,188	3,285	26,903	30,136	3,510	26,626	25,000	0.07	40,000	0.07	Massachusetts
136,423	81,405	55,018	133,829	79,950	53,879	65,000	0.19	110,000	0.20	Rhode Island
										Connecticut
1,542,983	1,234,460	308,523	1,291,857	993,601	298,256	4,010,000	11.52	4,960,000	9.03	**Middle Atlantic**
18,902	8,658	10,244	17,051	8,883	8,168	50,000	0.14	90,000	0.16	New York
169,996	165,055	4,941	169,996	165,055	4,941	257,000	0.74	638,000	1.16	New Jersey
										Pennsylvania
29,753	24,486	5,267	28,663	24,236	4,427	55,000	0.16	166,000	0.30	**East North Central**
29,199	25,489	3,710	27,122	21,236	5,886	40,000	0.12	110,000	0.20	Ohio
85,002	73,591	11,411	85,002	73,591	11,411	189,000	0.54	361,000	0.66	Indiana
281,618	242,052	39,566	267,139	228,353	38,786	168,000	0.48	274,000	0.50	Illinois
404,282	260,208	144,074	330,737	195,473	125,264	285,000	0.82	480,000	0.87	Michigan
										Wisconsin
211,850	151,917	59,933	205,180	145,247	59,933	203,000	0.58	401,000	0.73	**West North Central**
177,280	175,010	2,270	173,437	169,614	3,823	169,000	0.49	395,000	0.72	Minnesota
17,970	17,670	300	17,970	17,670	300	67,000	0.19	152,000	0.27	Iowa
245	0	245	245	0	245	82,000	0.23	193,000	0.35	Missouri
18,171	6,050	12,121	18,227	6,050	12,177	63,000	0.18	110,000	0.20	North Dakota
19,716	16,316	3,400	14,726	12,036	2,690	183,000	0.53	342,000	0.62	South Dakota
14,504	9,901	4,603	14,611	10,008	4,603	104,000	0.30	251,000	0.46	Nebraska
										Kansas
3,133	0	3,133	3,133	0	3,133	5,000	0.01	10,000	0.02	**South Atlantic**
7,230	2,120	5,110	7,230	2,120	5,110	*106,000	*0.30	*238,000	*0.43	Delaware
666	0	666	666	0	666	.....	.....	.....	.....	Maryland
109,798	82,656	27,142	103,693	76,551	27,142	459,000	1.32	812,000	1.48	District of Columbia
14,711	8,446	6,265	14,675	8,410	6,265	355,000	1.02	980,000	1.78	Virginia
431,500	246,400	185,100	329,853	126,205	203,648	540,000	1.55	816,000	1.48	West Virginia
357,510	348,750	8,760	330,012	321,250	8,762	429,000	1.23	632,000	1.15	North Carolina
364,394	350,320	14,074	281,111	262,495	18,616	572,000	1.65	958,000	1.74	South Carolina
7,036	7,036	0	6,536	2,736	3,800	10,000	0.03	18,000	0.03	Georgia
										Florida
1,256	352	904	855	115	740	77,000	0.22	184,000	0.33	**East South Central**
128,465	127,439	1,026	126,891	125,865	1,026	432,000	1.24	710,000	1.29	Kentucky
215,863	196,025	19,838	117,788	102,400	15,388	472,000	1.35	1,050,000	1.91	Tennessee
0	0	0	0	0	0	30,000	0.09	60,000	0.11	Alabama
										Mississippi
1,189	720	469	1,189	720	469	125,000	0.36	178,000	0.32	**West South Central**
0	0	0	0	0	0	1,000	0.00	2,000	0.00	Arkansas
1,718	1,718	0	1,718	1,718	0	70,000	0.20	194,000	0.35	Louisiana
13,820	10,077	3,743	13,367	10,077	3,290	238,000	0.69	514,000	0.94	Oklahoma
										Texas
345,040	343,100	1,940	344,420	342,480	1,940	2,550,000	7.32	3,700,000	6.72	**Mountain**
270,918	269,021	1,897	224,368	222,471	1,897	2,122,000	6.10	4,032,000	7.33	Montana
7,886	7,560	326	7,560	7,560	0	704,000	2.02	1,182,000	2.15	Idaho
87,978	77,880	10,098	91,648	79,708	11,940	765,000	2.20	1,570,000	2.85	Wyoming
1,322	1,322	0	799	799	0	116,000	0.33	186,000	0.34	Colorado
38,760	38,760	0	38,760	38,760	0	2,759,000	7.92	2,887,000	5.25	New Mexico
115,329	110,344	4,985	106,096	101,844	4,252	1,420,000	4.08	1,586,000	2.88	Arizona
13,550	12,950	600	13,450	12,850	600	300,000	0.86	370,000	0.67	Utah
										Nevada
480,356	469,139	11,217	454,356	443,139	11,217	4,970,000	14.27	7,871,000	14.30	**Pacific**
206,865	147,620	59,245	185,215	125,970	59,245	3,665,000	10.53	6,715,000	12.20	Washington
1,451,830	1,432,748	19,082	1,149,099	1,129,954	19,145	4,603,000	13.22	6,674,000	12.13	Oregon
										California

*Maryland and District of Columbia. †Data supplied by United States Geological Survey

Apparatus Developments Not Confined to Any One Field of Application





PICTORIAL representation of apparatus developments during 1926 would require a volume by itself, there being hardly a field of application for which some equipment has not been developed. In some cases the feature has been magnitude of size or rating; in others marked changes or improvement; and a few cases for new applications. Just four examples typifying the variety are shown. One is an 800-amp., 230-volt air breaker for underground networks; another shows two 1,000-kw. mercury-arc rectifiers serving the Chicago, North Shore & Milwaukee Railroad; below are flexible oil reservoirs for high-voltage single-conductor cable joints, and to the right is a 400,000-volt cathode-ray tube.

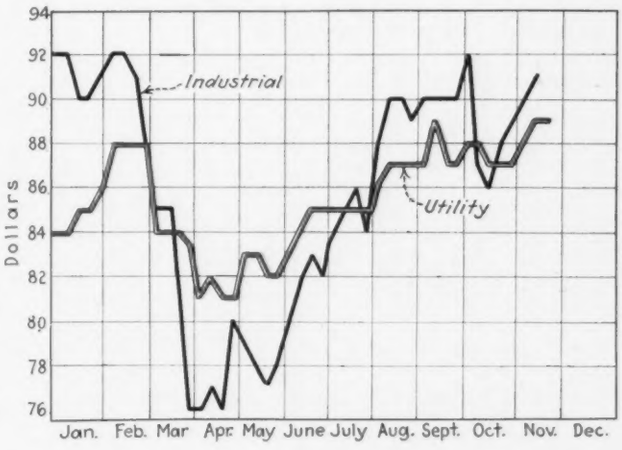
Courtesy General Electric Co.

Stocks Recover from Spring Crash

Growing Public Confidence in Power and Light Securities Evidenced by Market Strength and Volume of Buying During 1926

NOTHING affords stronger evidence of public confidence in the utility industry than the resilience with which utility security prices recovered from the severe break of last March. Notwithstanding the fact that the decline was expected and that few cared to predict a quick recovery, the investing public—private and institutional, customer and employee—were willing to advance funds in larger volume than ever before. Less than a month elapsed before renewed buying commenced, and market levels tended steadily upward.

At the beginning of the year the bull market that began in 1923 was still in progress and continued until the March break took place. The decline that did occur was probably less than 10 per cent, against nearly double that percentage in the industrial list. Most utility and industrial stocks began to recover in April, and since that time utilities have risen along with industrials until levels that existed before the crash have again been reached. There has been one important difference between the movement of utilities and that of industrials. The former have shown a much higher degree of stability. Although both classes recovered in approximately a six-month period, the trend of utilities has been much steadier, and reactions have been less frequent and less severe.



Utility Stocks Have Been Stable in 1926

Utility bond prices during the year continued the upward movement that also commenced in 1923. Demand for better grade power and light bonds has continued to expand following legislation in certain states making these bonds legal for savings bank and trust investment. Among other requirements such legislation in general insists that the utility be incorporated under the laws of the United States or of some one of the states; that it be subject to the supervision of the public service or other regulatory commission; that it be engaged in the sale and distribution of electricity or gas and must be carrying on at least 80 per cent of its business within the United States. Its franchise must cover at least 75 per cent of its gross income and must run for three years beyond the maturity of its bonds. Its funded debt must not exceed 60 per cent of the total investment nor 60 per cent of the actual book value of the fixed property. Stock and bond quotations for the past two years follow:

Market Record of Public Utility Stocks

	Par	Outstanding	Dividend Rate	Callable at	1925 Stock Market Record H.	1925 Stock Market Record L.	1926* Stock Market Record H.	1926* Stock Market Record L.
Abitibi Pwr. & Paper, com.	No	250,000	sh.$4.00	.....	76	62	98	70
Adirondack Pwr. & Lt., pf.	100	$9,648,200	7%	115	106	98	108	101
Adirondack Pwr. & Lt., pf.	100	$2,554,700	8%	115	115	103	115	101
Adirondack Pwr. & Lt., com.	50	$9,311,300	.....	.....	98	31	.....	.....
Ala. Pwr., pf.	100	$487,800	7%	115	106	97	109	103
Allis-Chalmers Mfg., pf.	100	$16,500,000	7%	110	109	103	111	105
Allis-Chalmers Mfg., com.	100	$26,000,000	6%	.....	97	71	94	78
Alum. Co. of Amer., com.	No	1,472,625	sh.	.....	.....	.....	76	54
Alum. Co. of Amer., pf.	100	$73,638,000	6%	110	.....	.....	103	96
Amer. & Foreign Pwr., pf.	No	356,406	sh.$7.00	110	94	87	98	79
Amer. & Foreign Pwr., com.	No	936,638	sh.	.....	51	27	42	14
Amer. Bosch Magneto, com.	No	207,399	sh.	.....	54	26	34	16
Amer. Brown Boveri Elec.	No	300,000	sh.	.....	.....	.....	50	30
Amer. Brown Boveri Elec., pf.	100	$3,000,000	$7.00	110	53	49	97	86
Amer. Gas & Elec., pf.	No	396,401½	sh.$6.00	110	93	85	98	91
Amer. Gas & Elec., com.	No	1,286,941	sh.	.....	85	70	111	64
Amer. Lt. & Trac., pf.	100	$14,236,200	6%	N. C.	115	93	132	105
Amer. Lt. & Trac., com.	100	$34,797,600	7%	.....	288	139	264	195
Amer. Pwr. & Lt., pf.	No	235,775	sh.$6.00	115	95	84	98	92
Amer. Pwr. & Lt., com.	No	1,647,510	sh.$1.00	.....	67	52	72	50
Amer. Pub. Serv., pf.	100	$7,187,600	7%	110	96	88	97	92
Amer. Pub. Serv., com.	100	$6,919,108	$8.00	.....	90	45	80	45
Amer. Pub. Utilities, pr. pf.	100	$2,870,590	7%	110	95	87	95	86
Amer. Pub. Utilities, com.	100	$2,822,400	.....	.....	103	70	82	68
Amer. States Sec. A.	No	698,409	sh.	.....	.....	.....	9	2
Amer. States Sec. B.	No	392,890	sh.	.....	.....	.....	5	1
Amer. Superpwr., pf.	25	194,127	sh. 7	110	.....	.....	26	23
Amer. Superpwr., pf.	100	80,000	sh.$5.00	.....	.....	.....	96	91
Amer. Superpwr., Class A.	No	173,000	sh.	.....	.....	.....	37	11
Amer. Superpwr., Class B.	No	739,950	sh.	.....	.....	.....	39	23
Amer. Wtr. Wks. & Elec., pf.	100	$14,050,000	$7.00	110	103	98	108	101
Amer. Wtr. Wks. & El., com.	20	$11,949,350	.....	.....	76	34	74	40
Anaconda Copper	50	$150,000,000	$3.00	.....	.....	.....	51	49
Appalachian Elec. Pwr., pf.	100	225,000	sh. 7%	112	100	92	101	98
Appalachian El. Pwr., 2nd pf.	100	100,000	sh. 7%	112	101	95	102	90
Appalachian El. Pwr., com.	100	5,000,000	sh.	.....	83	70	83	79
Arizona Pwr.	100	$964,450	7%	105	87	75	82	69
Arizona Pwr., com.	100	$3,000,000	.....	.....	34	15	39	16
Arkansas Cent. Pwr., pf.	No	10,101	sh.$7.00	110	102	97	107	90
Arkansas Lt. & Pwr., pf.	No	40,947	sh. 7%	110	102	92	102	90
Arkansas Lt. & Pwr., com.	No	38,000	sh.	.....	101	65	115	11
Asheville Pwr. & Lt., pf.	No	10,000	sh.$7.00	115	104	98	107	10
Assoc. Gas & Elec., pf.	No	157,052	sh.$3.50	105	.....	.....	.....	.....
Assoc. Gas & Elec., pf.	No	46,143	sh.$6.00	105	.....	.....	85	79
Assoc. Gas & Elec., Class A.	No	268,419	sh.$2.00	N. C.	.....	.....	38	25
Babcock & Wilcox, com.	100	$20,000,000	7%	.....	.....	.....	149	112
Bingham. L., H. & P., pf.	100	$48,200	$6.00	110	.....	.....	95	90
Birmingham Elec., pf.	No	38,397	sh.$7.00	110	103	98	103	101
Blackstone Val. Gas & El., pf.	100	$1,294,200	6%	115	.....	.....	106	103
Blacks. Val. Gas. & El., com.	50	$6,487,250	10%	.....	.....	.....	106	100
Blaw-Knox, com.	25	$6,217,625	.....	.....	60	59	80	45
Brazilian Trac. L. & P., com.	100	$106,583,700	4%	.....	.....	.....	.....	.....
Broad River Pwr., pf.	100	$2,652,600	7%	110	97	90	98	93

*Closing Date Dec. 23. †Callable in series.

	Par	Outstanding		Dividend Rate	Callable at	1925 Stock Market Record H.	1925 Stock Market Record L.	1926* Stock Market Record H.	1926* Stock Market Record L.
Brooklyn Edison, com.	100	$74,010,200		8%	.....	156	120	163	133
Buffalo Gen. Elec., com.	No	748,790	sh.	$1.60	.....	77	50	...	...
Buf'lo Niagara & E. Pwr., pf.	25	$48,399,100		$1.60	26	...	...	62	22
Buf'lo Niag. & E. Pwr., com.	No	1,935,944	sh.	.....	.....	...	...	38	23
California Elec. Generat'g, pf.	100	$2,500,000		6%	100	...	...	95	89
California Ry. & Pwr., pf.	100	$1,300,000		7%	†	...	...	130	88
Carolina Pwr. & Lt., pf.	No	111,857	sh.	$7.00	110	107	100	108	102
Central & S. W. Util., 7% pf.	No	112,000	sh.	$7.00	120	90	88	94	89
Cent. & S. W. Util., pr. in. pf.	No	90,000	sh.	$7.00	120	100	96	99	92
Central Ark. Ry. & Lt., pf.	100	$1,500,000		7%	110	98	91	101	99
Central Ill. Pub. Serv., pf.	100	$799,300		6%	110	93	84	91	89
Central Ind. Pwr., pf.	100	7,764,200		7%	.....	95	88	93	84
Central Pwr. & Lt., pf.	100	$7,005,000		7%	110	96	88	103	94
Central States Elec., pf.	100	$210,840		7%	N. C.	98	87	97	91
Central States Elec., com.	100	$814,083		.....	.....	250	70	230	200
Century Elec., com.	100	$3,370,100		5%	.....	110	103	116	110
Chicago Fuse Mfg., com.	No	60,000	sh.	$2.50	.....	39	27	35	30
Cincinnati Gas & Elec., com.	100	$34,398,100		5%	.....	90	82	95	88
Cities Service, pf.	100	$85,900,796		6%	.....	84	80	92	82
Cities Service, pf. B.	10	$4,174,078		6%	.....	...	...	8	7
Cities Service, pf. BB.	100	$2,610,419		6%	.....	...	...	83	74
Cities Service, com—20.	20	$75,417,420		6%	.....	43	34	49	37
Cities Service, Bks. Shrs.—10	...	30,000	sh.	.....	.....	22	16	22	19
Clarion River Pwr., pf.	100	$4,453,000		8%	110	...	...	95	93
Cleveland Elec. Illg., pf.	100	$15,281,700		6%	110	105	101	108	103
Cleveland Elec. Illg., com.	100	$16,629,800		10%	.....	250	200	310	240
Columbia Gas & Elec., pf. A.	100	$24,158,400		7%	115	113	104	117	111
Columbia Gas & Elec., com.	No	1,500,000	sh.	$2.60	.....	86	45	90	63
Columbia Ry., Gas & El., pf.	100	$895,300		6%	N. C.	90	90	96	65
Columbus Elec. & Pwr., s pf.	100	$950,000		.....	115	...	...	...	...
Columbus Elec. & Pwr., com.	100	$5,158,900		10	.....	...	...	...	...
Columbus Ry., P.&L., 1st pf.	100	$6,120,400		6%	110	99	86	99	98
Columbus Ry., P.&L., pf. B.	100	$5,014,700		6½%	110	85	80	97	92
Columbus Ry., P.&L., com.	No	150,136	sh.	.....	.....	85	70	85	70
Commonwealth Edison, com.	100	$96,748,500		8%	.....	141	130	142	135
Commonwealth Pwr., pf.	100	$36,612,100		6%	105	88	80	91	82
Commonwealth Pwr., com.	No	1,130,905	sh.	$3.00	.....	43	30	43	29
Conn. Lt. & Pwr., pf.	100	$4,000,000		8%	120	118	115	121	117
Conn. Lt. & Pwr., pf.	100	$4,500,000		7%	120	110	105	113	108
Cons. Gas of N. Y., pf.	50	$15,000,000		7%	†	...	...	61	57
Cons. Gas of N. Y., com.	No	3,600,000	sh.	$5.00	.....	97	74	115	87
Cons. G. E. L.&P. of Balt., pf.	100	$1,000,000		6%	110	105	102	107	102
Cons. G. E. L.&P. of Balt., pf.	100	$3,983,500		6½%	110	110	105	112	108
Cons. G. E. L.&P. of Balt., pf.	100	$2,000,000		7%	110	114	109	115	109
Cons. G. E. L.&P. of Balt., pf.	100	$5,000,000		8%	125	127	122	128	142
Cons. G. E. L.&P. of Balt., com.	No	825,500	sh.	$2.00	.....	47	32	57	45
Cons. Pwr. & Lt., pf.	100	$3,091,000		7%	110	...	...	107	100
Consumers Pwr., pf.	100	$17,463,500		6%	105	97	90	100	95
Consumers Pwr., pf.	100	$21,086,700		6.6%	105	102	97	103	100
Continental G. & El., ptc. pf.	100	4,615,500		ƒ8%	110	97	85	109	96
Continental G. & El., pr. pf.	100	$11,757,500		7%	110	97	89	101	95
Continental G. & El., com.	No	169,755	sh.	$4.40	.....	152	77	210	85
Croker-Wheeler, com.	100	20,518	sh.	.....	.....	28	14	26	14
Croker-Wheeler, pf.	100	$863,200		7%	108	80	47	65	50
Dallas Pwr. & Lt., pf.	100	$3,500,000		7%	110	102	100	107	102
Dayton Pwr. & Lt., pf.	100	$7,500,000		6%	110	100	88	100	95
Dayton Pwr. & Lt., com.	No	317,500	sh.	4%	.....	460	180	...	...
Detroit Edison, com.	100	78,567,100		8%	.....	159	110	141	123
Dubilier Condenser, com.	No	304,150	sh.	.....	.....	...	...	11	3
Dubuque Elec., pf.	100	$800,900		6%	110	90	80	98	93
Duquesne Lt., pf.	100	$30,000,000		7%	115	112	104	115	111
East. N. Y. Util., pf.	No	8,000	sh.	$7.00	112½	...	...	104	80
East. N. Y. Util., com.	No	$1,375,000		.....	.....	...	...	75	70
East. States Pwr.	No	535,306	sh.	.....	.....	...	...	32	12
East. States Pwr., pf.	No	40,000	sh.	$7.00	110	...	...	95	89
East. Tex. Elec., pf.	100	$2,127,100		7%	110	105	100	107	100
East. Tex. Elec., com.	No	87,890	sh.	$5.00	.....	75	70	80	70
Edison El. Illum. of Bost., com	100	$46,714,100		12%	.....	213	200	250	207
El Paso Elec., com.	No	57,982	sh.	$5.00	.....	...	...	94	70
El Paso Elec., pf.	100	$2,380,600		7%	115	...	...	104	102
Elec. Bond & Share, pf.	100	$25,000,000		6%	110	106	101	110	104
El. Bond. & Share, sec. com.	No	$25,000,000		$1.00	.....	80	56	86	56
Elec. Household Util.	10	$3,611,460		.....	.....	...	...	25	11
Elec. Investors, pf.	No	50,000	sh.	$6.00	110	96	95	95	87
Elec. Investors, com.	No	778,146	sh.	.....	.....	79	30	74	30
El. Invest., 10% pd. receipts	...	68,790	sh.	.....	.....	62	15	56	12
Elec. Pwr. & Lt., com. pf.	No	403,561	sh.	$7.00	110	94	89	98	89
Elec. Pwr. & Lt. Cfts., com.	No	1,621,729	sh.	.....	.....	40	17	34	15
Elec Refrig.	No	571,259	sh.	.....	.....	...	...	78	33
Elec. Ry. Securities, com.	No	80,000	sh.	.....	.....	...	...	10	4
Elec Storage Battery, com.	No	797,917	sh.	.....	.....	80	60	94	71
Elmira Wtr., Lt. & R.R., pf.	100	$1,957,100		7%	N. C.	98	93	99	97
Emerson Elec., pf.	100	$950,000		.....	115	101	95	104	100
Empire Dist. Elec., pf.	100	$2,861,200		6%	87	85	78	87	80
Empire Pwr., A.	No	400,000	sh.	.....	.....	...	...	32	21
Engr. Pub. Serv., pf.	No	286,099	sh.	7%	110	103	100	96	93
Engr. Pub. Serv., com.	No	775,121	sh.	.....	.....	30	19	24	20
Eureka Vac. Cleaner, com.	No	250,000	sh.	.....	.....	57	48	68	43
Fairbanks-Morse, pf.	100	$7,529,425		$7.00	110	110	106	115	106
Fairbanks-Morse, com.	No	368,977	sh.	$2.60	.....	54	32	59	40
Federal Lt. & Trac., com.	15	$6,019,245		$2.80	.....	37	26	47	28
Federal Lt. & Trac., pf.	No	39,374	sh.	$6.00	110	86	82	91	86
Federal Utilities, pf.	100	$1,000,000		6%	.....	...	...	...	...
Federal Utilities, com.	100	$2,000,000		.....	.....	...	...	...	...
Ft. Worth Pwr. & Lt., pf.	100	$2,297,600		7%	115	107	99	110	104
Galveston-Houston Elec., pf.	100	$3,000,000		6%	120	75	70	70	65
Galveston-Houston El., com.	100	$3,988,000		.....	.....	40	20	30	21
Gen. Elec., com.	100	7,211,481	sh.	8%	.....	337	227	95	79
Gen Elec., special—10.	10	$42,947,280		6%	.....	11	10	11	11
Gen. Gas & Elec. A.	...	317,706	sh.	$3.00	.....	240	72	59	34
Gen. Gas & Elec., pf. A.	...	400,000	sh.	$7.00	N. C.	175	120	100	95
Gen. Gas & Elec., 8% pf. A.	...	62,414	sh.	$8.00	N. C.	240	72	113	105
Gen. Gas & Elec., pf. B.	...	43,420	sh.	$7.00	.....	175	90	96	92
General Pub. Serv., com.	No	400,000	sh.	.....	.....	...	...	16	12
Ga. Lt., Pwr. & Rys., pf.	100	$500,000		6%	110	85	74	98	82
Ga. Lt., Pwr. & Rys., com.	100	$7,660,000		.....	.....	74	25	80	56
Ga. Ry. & Elec., pf.	100	$2,400,000		5%	.....	84	78	...	...
Ga. Ry. & Elec., com.	100	$8,514,600		8%	.....	115	115	...	...
Ga. Ry. & Pwr., pf.	100	$3,900,000		8%	115	...	...	114	112
Ga. Ry. & Pwr., pf.	100	$4,000,000		7%	115	...	...	...	...
Ga. Ry. & Pwr., com.	100	$25,000,000		4%	.....	145	62	...	...
Gt. Western Pwr., pf.	100	$12,111,784		7%	105	...	...	...	...
Idaho Pwr., pf.	100	$3,750,000		7%	110	102	97	...	...
Ill. No. Utilities, pf.	100	$3,765,800		6%	110	92	82	92	90
Ill. Pwr. & Lt., pf.	100	$32,060,350		7%	105	98	92	...	...
Ingersoll Rand.	No	1,000,000	sh.	8%	.....	...	...	105	80
Int. Combus. Engr., com.	No	646,137	sh.	$2.00	.....	69	31	64	33
Int. Utilities, Class A.	No	133,762	sh.	$3.50	.....	40	32	39	25
Int. Utilities, Class B.	No	463,599	sh.	.....	.....	...	...	3	9
Interstate Pwr., pf.	No	55,000	sh.	$7.00	115	98	90	...	...
Interstate Pub. Serv.	100	$9,045,700		7%	110	100	90	99	96
Iowa Ry. & Lt.	100	5,148,654		7%	102½	100	92	100	98
Jersey Cent. Pwr. & Lt.	100	$5,400,000		7%	115	96	90	...	...
Jersey Cent. Pwr. & Lt., com	No	93,700	sh.	.....	.....	50	15	50	45
Johns-Manville, com.	No	250,000	sh.	$3.00	.....	...	...	183	130
Kansas City Pwr. & Lt., pf.	No	110,000	sh.	$7.00	105	...	...	112	107
Kansas Gas & Elec., pf.	100	$5,901,700		7%	115	103	97	003	99
Kentucky Hydro-Elec., pf.	100	$4,190,900		7%	110	94	85	95	91
Kentucky Sec., pf.	100	$2,348,898		6%	100	78	67	...	...
Kentucky Sec., com.	100	$2,052,287		5%	.....	100	77	...	...
Kentucky Utilities, pf.	100	$6,100,100		6%	110	95	82	95	90
Keystone Pwr. & Lt., pf.	100	$1,642,500		7%	†	95	90	97	95
Kings County Ltg., pf.	100	$1,816,400		7%	115	...	...	...	...
Kings County Ltg., pf.	100	$500,000		8%	105	106	103	...	...
Laclede Gas Lt., com.	100	$10,700,000		8%	.....	178	110	175	146
Lehigh Pwr. Sec., com.	No	3,104,450	sh.	.....	.....	196	82	22	10
Long Island Ltg., pf.	100	$7,229,300		7%	110	105	100	...	...
Long Island Ltg., com.	No	300,000	sh.	$2.00	.....	142	60	150	120
Los Angeles Gas & Elec., pf.	100	$18,565,300		6%	N. C.	98	90	...	...
Louisville Gas & El., Class A.	No	501,880	sh.	$1.75	.....	...	...	26	22
Manhattan Elec. Supply.	No	81,000	sh.	$4.25	.....	...	...	87	44
Manila Elec., com.	No	400,000	sh.	.....	.....	49	28	45	27
Maytag Mfg., com.	No	1,600,000	sh.	.....	.....	26	21	24	19
Memphis Pwr. & Lt., pf.	No	30,000	sh.	$7.00	110	102	98	109	103
Metropolitan Edison, pf.	No	134,952	sh.	$6.00	110	96	92	...	...
Metropolitan Edison, pf.	No	17,252	sh.	$7.00	110	110	100	...	...
Metropolitan Edison, com.	No	129,842	sh.	.....	.....	...	...	50	45
Middle West Utilities, pf.	100	$37,200,000		7%	120	98	91	111	97
Middle W. Util., pr. lien. pf.	100	$30,000,000		8%	120	108	98	123	106
Middle West Utilities, com.	No	395,004	sh.	$6.00	.....	125	92	134	108
Midland Utilities, pr. lien pf.	100	$14,200,000		7%	120	101	98	104	98
Midland Utilities, pf. A.	100	$10,000,000		7%	110	97	92	99	96
Milwaukee El. Ry. & Lt., pf.	100	$6,012,000		7%	103	105	96	102	100
Milwaukee El. Ry. & Lt., pf.	100	$4,500,000		6%	.....	87	83	88	87
Minn. Pwr. & Lt., pf.	100	$8,204,800		7%	110	102	97	104	100
Miss. Pwr. & Lt., pf.	No	10,754	sh.	$8.00	115	...	...	105	102
Miss. River Pwr., pf.	100	$8,234,475		6%	115	94	87	...	...
Miss. River Pwr., com.	100	$16,000,000		.....	.....	124	37	...	...
Mohawk Hudson Pwr., 1st pf	No	279,157	sh.	$7.00	107½	...	...	105	89
Mohawk Hudson Pwr., 2pf.	No	187,432	sh.	$7.00	107½	...	...	...	...
Mohawk Hudson Pwr., com.	No	995,437	sh.	.....	.....	...	...	28	20
Montana Pwr., pf.	100	$9,784,600		7%	120	117	109	119	112
Montana Pwr., com.	100	$49,633,300		4%	.....	99	64	83	69
Montreal Pwr., com.	100	$13,800,000		8%	.....	...	...	...	...
Mountain States Pwr., pf.	100	$2,551,900		7%	110	...	...	...	...
Mountain States Pwr., com.	No	130,000	sh.	$1.00	.....	...	...	...	...
Nassau & Suffolk Ltg., pf.	100	$911,700		7%	112	...	...	...	...
National Carbon, com.	No	419,250	sh.	.....	.....	130	120	...	...
National Carbon, pf.	100	$5,600,000		2%	.....	130	120	128	125
National Elec. Pwr., A.	No	231,721	sh.	$1.80	.....	...	...	26	19
National Elec., Pwr., pf.	100	$4,500,000		7%	110	96	94	102	94
Natl. Lt., Ht. & Pwr., com.	100	$1,759,700		.....	.....	30	11	25	22
Natl. Lt., Ht. & Pwr., pf.	100	$1,598,737		5%	110	72	40	73	71
Natl. Pwr. & Lt., pf.	No	140,298	sh.	$7.00	110	99	95	102	96
Natl. Pwr. & Lt., com.	No	2,544,150	sh.	$6.00	.....	467	185	38	16
National Pub. Serv., pf.	100	$5,250,000		7%	115	...	...	...	...
National Pub. Serv. ptc. pf.	100	$3,923,300		$7%	115	...	...	1	...
National Pub. Serv., A com.	No	193,303	sh.	1.60	.....	...	...	24	15
National Pub. Serv., B com.	No	296,721	sh.	.....	.....	...	...	17	10
Nebraska Pwr, pf.	100	$5,200,000		7%	110	103	98	107	103
Nevada-Calif. Elec., com.	100	$8,588,300		.....	.....	58	29	44	18
New Brunswick Pwr. pf.	100	$1,000,000		7%	115	...	...	55	30
New England Pub. Serv., pr. ln. pf.	No	80,000	sh.	$7.00	120	...	...	99	98
New England Pub. Serv., pf.	No	40,000	sh.	$7.00	120	...	...	97	95
N. J. Pwr. & Lt., pf.	100	$987,800		7%	110	102	92	111	104
New Orleans Pub. Serv., pf.	100	79,177	sh.	7%	110	102	94	...	...
New Orleans Pub. Serv., com.	No	723,218	sh.	$2.25	.....	38	31	...	...
New York & Queens El. Lt. & Pwr., pf.	100	$1,250,000		5%	N. C.	...	...	95	...
N. Y. Central Elec., pf.	100	$3,932,600		7%	110	101	96	100	98
Newport News & Hampton Ry. Gas & El., com.	100	$2,800,000		5%	.....	...	...	112	98
Newport News & Hampton Ry., Gas & El., pf.	100	$1,500,000		7%	110	...	...	114	98
Niagara Falls Pwr., pf.	25	680,312	sh.	7%	.....	29	27	28	27
Niagara Lock & Ont. Pwr., pf.	100	$9,792,500		7%	115	110	101	111	110
Niagara Lock & Ont. Pwr., com.	No	300,000	sh.	$2.00	.....	73	60	...	...
No. Amer., pf.	50	606,715	sh.	6%	105	50	46	52	49
No. Amer., com.	10	4,003,984	sh.	6%	.....	75	41	67	42
No. Amer. Edison, pf.	No	200,000	sh.	6.00	105	...	...	96	91
No. Amer. Lt. & Pwr., pf.	100	$5,000,000		7%	105	...	...	104	88
N. C. Pub. Serv., pf.	100	22,254	sh.	$7.00	110	96	90	...	...
Northeastern Pwr., com.	No	2,021,866	sh.	.....	.....	...	...	36	15
No. Indiana Gas & El., pf. A.	100	$7,000,000		7%	†	...	...	103	98
No. Indiana Pub. Serv., pf.	100	$1,836,300		7%	.....	...	...	...	...
No. N. Y. Utilities, pf.	100	$6,000,000		7%	110	...	...	...	...
No. Ohio Pwr., com.	No	500,000	sh.	.....	.....	19	5	26	11
No. Ohio Pwr. & Lt., pf.	100	$4,612,100		6%	110	75	64	81	78

*Closing date Dec. 23. †Callable in series.

	Par	Outstanding		Dividend Rate	Callable at	1925 Stock Market Record H.	1925 Stock Market Record L.	1926* Stock Market Record H.	1926* Stock Market Record L.
No. Ohio Pwr. & Lt., pf.	100	$2,355,300		7%	110	...	...	96	88
No. Ont. Lt. & Pwr., pf.	100	$2,400,000		6%	N. C.	78	68	88	75
No. Ont. Lt. & Pwr., com.	100	$4,585,000		4%	...	52	41	75	45
No. States Pwr., pf.	100	$5,000,000		7%	110	100	95	101	45
No. States Pwr., com.	100	$2,500,000		8%	...	144	103	136	98
No. Texas Elec., pf.	100	$4,000,000		6%	110	75	60	94	65
No. Texas Elec., com.	100	$3,150,000		4%	...	70	40	45	17
Ohio Brass, com., A and B.	No	288,387	sh.	$4.00	...	...	...	80	70
Ohio Brass, pf.	100	$2,000,000		6%	105	...	...	101	98
Ohio Gas & Elec., pf.	100	$291,200		7%	110	100	87	95	40
Ohio Pwr., pf.	100	$14,113,300		6%	110	95	85	96	60
Ohio Pub. Serv., pf.	100	$1,654,200		6%	110	...	...	94	93
Onio Pub. Serv., pf.	100	$8,558,100		7%	115	100	97	100	92
Ohio River Edison, pf.	100	$4,600,000		7%	110	100	93	105	98
Oklahoma Gas & Elec., pf.	100	$11,379,700		7%	125	...	...	...	...
Pacific Gas & Elec., pf.	100	$59,676,400		6%	N. C.	99	92	...	...
Pacific Gas & Elec., com.	100	$51,235,100		8%	...	137	102	133	118
Pacific Pwr. & Lt., pf.	100	$5,780,900		7%	115	102	97	103	101
Penn Central Lt. & Pwr., pf.	No	89,254	sh.	$5.00	80	72	60	91	70
Penn-Ohio Edison, pf.	100	$6,217,000		7%	110	...	...	97	94
Penn-Ohio Elec., pf.	100	$4,241,700		7%	115	96	83	96	93
Penn-Ohio Pwr. & Lt., pf.	100	$1,450,000		7%	110	100	91	97	94
Penn-Ohio Pwr. & Lt, pf.	100	$3,038,100		8%	115	110	101	109	100
Penn Pwr. & Lt.	No	364,255	sh.	$7.00	103	106	98	108	103
Penn Pub. Serv., pf.	100	$6,414,420		7%	103	100	90	103	96
Penn Pub. Serv., pf.	100	$1,507,300		6%	103	90	80	90	85
Penn Wtr. & Pwr., com.	100	15,000	sh.	8%	...	185	126	168	140
Phila. Co., pf.	50	291,800	sh.	6%	...	49	37	51	45
Phila. Co., com.	50	928,860	sh.	6%	...	66	52	91	59
Phila. Elec., com.	25	$79,670,325		8%	...	57	37	67	41
Pittsburgh Utilities, pf.	10	750,000	sh.	7%	...	17	12	20	14
Portland Elec. Pwr., pf.	100	$6,807,700		7%	105	99	95	104	97
Portland Elec. Pwr., pf.	100	$6,250,000		6%	N. C.	80	70	87	71
Portland Elec. Pwr., 2nd pf.	100	$5,000,000		6%	105	...	...	75	71
Portland Elec. Pwr., com.	100	112,500	sh.	...	...	53	40	48	26
Potomac Elec. Pwr., pf.	100	$2,000,000		6%	110	...	...	...	...
Pwr. Corp. of N. Y., com.	No	677,569	sh.	$1.00	...	89	15	90	77
Pwr. Sec., pf.	No	58,054	sh.	...	...	55	10	29	10
Pwr. Sec., com.	No	150,000	sh.	...	...	30	8	13	4
Pub. Serv. of N. J., pf.	100	$28,465,200		7%	N. C.	106	99	110	103
Pub. Serv. of N. J., pf.	100	$21,531,200		8%	N. C.	119	109	124	115
Pub. Serv. of N. J., com.	No	1,192,425	sh.	$5.00	...	87	62	33	31
Pub. Serv. of No. Ill., pf.	100	$10,000,000		6%	120	101	92	106	99
Pub. Serv. of No. Ill., pf.	100	$6,357,600		7%	...	111	102	116	112
Pub. Serv. of No. Ill., com.	No	143,176	sh.	8%	...	132	107	140	121
Pub. Serv. of No. Ill., com.	100	$12,075,000		8%	...	130	118	143	128
Pub. Serv. of Okla., pf.	100	$2,319,900		7%	110	95	87	100	92
Pub. Serv. Elec. & Gas., pf.	100	$15,000,000		6%	110	100	92	104	97
Pub. Serv. of Colo., pf.	100	$7,102,759		7%	110	...	...	100	96
Pub. Serv. Elec. Pwr., pf.	100	$6,000,000		7%	115	...	...	114	106
Puget Sound Pwr. & Lt., pf.	100	$10,000,000		7%	110	107	102	108	103
Puget Sound Pwr. & Lt., pf.	No	160,000	sh.	$6.00	125	...	...	...	...
Puget Sound P. & L., com.	100	202,829	sh.	...	...	61	49	66	22
Radio Corp. of Am., pf.	50	$19,779,870		...	...	54	45	53	44
Radio Corp. of Am., com.	No	1,155,400	sh.	...	...	77	39	61	32
Republic Ry. & Lt., pf.	100	$5,191,400		...	110	93	70	120	95
Republic Ry. & Lt., com.	100	$6,206,000		...	...	67	49	98	75
Rochester Gas & El., pf. C.	100	$2,587,000		6%	105	...	...	103	100
Rochester Gas & El., pf.	100	$4,000,000		7%	105	...	...	107	105
San Joaquin Lt. & P., pf A.	100	$6,438,700		7%	N. C.	...	...	108	97
Safety Cable., com.	No	140,000	sh.	...	...	...	...	55	42
St. Joseph Ry. L., H. & P., pf.	100	$1,560,000		5%	105	...	...	70	60
Servel Corp.	No	560,000	sh.	...	...	...	...	22	5
Sierra Pacific Elec., com.	100	$8,000,000		...	...	...	...	28	23
Sioux City Gas & Elec., pf.	100	$4,055,800		7%	110	...	...	101	96
S. E. Pwr. & Lt., pf.	No	100,000	sh.	$7.00	110	100	90	103	97
S. E. Pwr. & Lt. pfc., pf.	No	426,093	sh.	$4.00	105	...	...	67	60
S. E. Pwr. & Lt., com.	No	2,022,975	sh.	...	...	34	28	46	21
So. Calif. Edison, pf.	100	$4,000,000		8%	N. C.	128	115	36	37
So. Calif. Edison, pf.	100	$24,962,900		7%	$ 28.75	107	105	28	24
So. Calif. Edison, pf.	100	$20,520,300		6%	$ 28.75	95	90	25	22
So. Calif. Edison, com.	100	$43,271,072		8%	...	149	102	33	30
Southern Cities Utilities, pf.	100	$2,32[illegible],767		7%	110	100	77	90	85
Southern Cities Util., com.	No	48,977	sh.	4%	...	71	30	30	22
Southwestern Lt. & Pwr., A.	100	$1,200,000		$3.00	...	...	...	60	52
Southwestern Lt. & Pwr., B.	No	22,936	sh.	...	...	...	...	58	38
Southwestern Lt. & Pwr., pf.	No	12,114	sh.	$6.00	110	...	...	82	78
Southwestern Pwr. & Lt., pf.	100	$8,387,000		7%	115	102	90	105	100
Springfield (Mo.) Ry.&L., pf.	100	$1,001,200		7%	115	93	92	100	95
Standard Gas & Elec., pf.	50	$16,500,000		8%	N. C.	56	50	57	53
Standard Gas & Elec., pf.	100	$21,000,000		7%	115	100	96	104	97
Standard Gas & Elec., com.	No	1,604,764	sh.	$3.00	...	61	40	69	51
Standard Pwr. & Lt., pf.	100	100,000	sh.	7%	110	114	95	97	90
Staten Island Edison, pf.	No	35,000	sh.	$6.00	103	...	...	97	93
Superheater, com.	No	197,041	sh.	$6.00	...	152	120	173	138
Syracuse Lighting, pf.	100	$1,000,000		7%	120	...	...	107	105
Syracuse Ltg., pf.	100	$2,000,000		8%	...	...	...	...	...
Syracuse Ltg., com.	100	$4,834,600		8%	...	...	...	355	260
Tampa Elec., com.	No	310,535	sh.	10%	...	...	...	67	45
Tenn Elec. Pwr., pf.	100	$4,832,400		6%	105	87	80	90	87
Tenn. Elec. Pwr., pf.	100	$8,345,400		7%	110	103	93	105	98
Terre Haute Ind. & E. Tr.,pf.	100	$9,100,000		5%	N. C.	...	...	37	20
Terre Haute In.&E.Tr.,com.	100	$9,100,000		...	...	...	...	7	1
Tex. Pwr. & Lt., pf.	100	$6,500,000		7%	115	106	99	109	103
Tide Water Pwr., pf.	100	$2,492,600		8%	115	...	...	106	101
Timken Roller Bearing, com.	No	1,200,882	sh.	...	...	59	37	85	44
Toledo Edison, pf.	100	$2,351,500		8%	115	114	109	115	112
Toledo Edison, pf.	100	$5,867,800		7%	110	101	94	104	101
Toledo Edison, pf.	100	$496,700		6%	...	...	...	94	89
Toledo Edison, com.	100	$13,875,000		6%	...	25	21	...	...
Tri-City Ry. & Lt.,pf.	100	$3,000,000		6%	120	85	82	90	87
United Gas & Elec., pf.	100	$6,499,400		6%	105	94	80	97	94
United Gas & Elec., com.	No	310,464	sh.	...	...	57	26	66	56
United Gas & Elec. (N.J.)pf.	100	$1,195,800		5%	105	65	55	75	70
United Gas Impr.	50	$81,461,100		8%	...	120	79	144	84
United Lt. & Pwr., pf.	No	76,352	sh.	$4.00	60	51	41	51	44
United Lt. & Pwr.	No	155,781	sh.	$6.50	105	99	83	91	81
United Lt. & Pwr., com. A.	No	1,993,675	sh.	$2.00	....	166	42	28	10
United Lt. & Pwr., com. B.	No	999,100	sh.	...	...	100	49	29	13
Utah Pwr. & Lt., pf.	100	$21,056,400		7%	115	101	97	105	100
Utica Gas & Elec., pf.	100	$6,000,000		7%	105	104	100	106	103
Utica Gas & Elec., com.	100	400,000	sh.	8%	...	200	100	...	...
Utilities Pwr. & Lt., pf.	100	$7,647,000		7%	105	97	90	98	92
Utilities Pwr. & Lt., com A.	No	278,935	sh.	$2.00	...	...	...	37	28
Utilities Pwr. & Lt., com B.	No	378,878	sh.	$1.00	...	22	12	18	13
Vermont Hydro-Elec., pf.	100	$757,500		7%	110	96	87	96	94
Virginia Elec. & Pwr., pf.	100	$9,758,030		7%	110	...	...	105	101
Wagner Elec., pf.	100	$1,500,000		7%	...	92	79	85	61
Wagner Elec., com.	No	78,278	sh.	...	...	50	26	34	13
Washington Ry. & El., com.	100	$6,500,000		5%	...	...	...	235	170
Washington Ry. & El., pf.	100	$8,500,000		5%	...	...	...	...	...
Washington Wtr. Pwr., com.	100	$23,027,700		8%	...	140	110	136	130
West. Mo. Pwr., pf.	100	$496,500		7%	...	...	...	...	...
West Penn Elec., pf.	100	$22,124,700		7%	120	...	...	102	95
West Penn Elec., Class A.	No	59,258	sh.	...	115	...	...	98	88
West Penn Pwr., pf.	100	$12,591,000		7%	115	111	104	115	108
West Va. Lt., Ht. & Pwr., pf.	100	$250,000		7%	105	96	94	98	85
West Va. Utilities, pf.	50	20,680	sh.	7%	105	47	38	51	43
Western Pwr., pf.	100	$9,655,380		7%	107½	...	84	98	97
Western States Gas & El., pf.	100	$2,125,000		7%	115	92	82	94	89
Western States G. & El., com.	100	$3,503,000		2%	...	...	...	...	...
Westgh. El. & Mfg., com.	50	2,290,089	sh.	8%	...	84	66	79	65
Weston El. Instru., Class A.	No	100,000	sh.	$2.01	....	28	19	32	27
Weston El. Instrument, com.	No	150,000	sh.	...	...	20	9	19	13
Wheeling Elec., pf.	100	$1,000,000		6%	110	...	...	97	91
Worthington Pump., pf. A.	100	$5,592,833		7%	115	88	76	80	44
Worthington Pump., pf. B.	100	$10,321,671		6%	105	76	58	65	37
Worthington Pump, com.	100	$12,692,149		...	...	79	35	44	19
Yale & Towne, com.	25	400,000	sh.	$5.00	....	70	62	70	60

Note: Dividends on common not stated unless a definite rate has been established.
*Closing Date Dec. 2. †Callable in series.

Electric Light and Power Bonds

	Rate	Due	Amount Issued	Market Record 1925 H.	Market Record 1925 L.	Market Record 1926† H.	Market Record 1926† L.
Abitibi Pwr. & Paper	6	1940	$3,647,000	101	98	103½	100
Adir Elec. Pwr.	5	1962	5,000,000	101	97	102	100
Adir Pwr. & Lt.	6	1950	14,346,000	105	102	107	105
Adir Pwr. & Lt.	5	1930	394,100	98	94	99	97
Ala. Pwr.	5	1946	10,221,000	100	96	101	99
Ala. Pwr.	5	1951	17,700,000	97	92	100	97
Ala. Pwr.	6	1951	21,000,000	105	101	105	104
Amer. Gas & Elec.	5	2007	6,282,000	93	90	99	92
Amer. Gas & Elec.	6	2014	46,904,000	99	96	102	99
Amer. Pwr. & Lt.	6	2016	45,91[illegible],400	98	94	101	96
Amer. Pub. Serv.	6	1942	8,308,700	99	94	101	98
Amer. Water Wks. & Elec.	5	1934	12,691,300	98	92	99	95
Amer. Water Wks. & Elec.	6	1975	8,000,000	95	94	97	93
Anaconda Copper	6	1929	16,933,000	104	102	103	102
Anaconda Copper	6	1953	104,731,000	102	99	104	101
Anaconda Copper	7	1938	50,000,000	105	99	107	102
Appalachian Pwr.	5	1941	11,887,000	99	96	101	98
Appalachian Pwr.	6	2024	4,000,000	94	86	99	93
Appalachian Pwr.	7	1936	2,500,000	106	105	108	105
Arizona Pwr.	6	1933	627,000	101	97	101	99
Arizona Pwr.	6	1947	2,222,000	96	90	97	95
Ark. Central Pwr.	6	1948	3,500,000	102	98	103	102
Ark. Lt. & Pwr.	6	1945	3,799,300	104	100	...	...
Ark. Lt. & Pwr.	6	1954	3,321,100	99	92	...	...
Assoc. Gas & Elec.	6	1955	12,369,000	96	92	105	92
Assoc. Gas & Elec.	6½	1954	1,803,700	106	94	105	94
Binghamton Lt., Ht. & Pwr.	5	1946	4,679,000	99	94	100	98
Birmingham Elec.	6	1954	8,000,000	103	99	104	102
Birmingham Ry., Lt. & Pwr.	4½	1954	8,593,000	89	85	92	88
Broad River Pwr.	5	1954	3,985,000	...	...	93	91
Broad River Pwr.	6½	1934	1,500,000	102	99	103	100
Brooklyn Edison	5	1949	30,500,000	103	99	105	102
Brooklyn Edison	6	1930	3,000,000	106	103	106	103
Buffalo Gen. Elec. 1st	5	1939	2,375,000	102	100	103	101
Buffalo Gen. Elec. 1st & Ref.	5	1939	7,029,000	100	100	103	101
Buffalo Gen. Elec.	5	1956	10,000,000	...	...	103	98
Burlington Ry. & Lt.	5	1932	1,643,000	96	90	97	96
Butte Elec. & Pwr.	5	1951	3,554,000	100	99	101	100
Cal. Elec. Gen.	5	1948	800,000	...	...	...	...
Cal. Gas & Elec.	5	1937	16,447,000	101	98	102	100
Calumet Gas & Elec.	5½	1960	2,700,000	99	97	102	97
Canadian Lt. & Pwr.	5	1949	3,299,700	62	36	64	56

*Notes. †Closing date Dec. 5.

	Rate	Due	Amount Issued	Market Record 1925 H.	1925 L.	1926† H.	1926† L.
Canton Elec.	5	1937	$1,188,000	100	99	101	100
Carolina Pwr. & Lt.	5	1956	18,000,000	....	....	101	97
Cedar Rap. Mfg. & Pwr.	5	1953	13,867,300	100	98	101	99
Central Ark. Ry. & Lt.	5	1928	1,659,000	100	98	100	99
Central Ga. Pwr.	5	1938	2,595,200	97	93	98	95
Central Ill. Lt.	5	1943	6,743,400	99	94	101	99
Central Ill. Pub. Serv.	5	1952	7,595,000	92	84	96	92
Central Ill. Pub. Serv.	5½	1950	4,600,000	98	96	100	96
Central Ill. Pub. Serv.	6	1944	8,000,000	101	96	103	99
Central Ind. Pwr.	6	1947	10,946,500	99	95	100	98
Central Ia. Pwr. & Lt.	6	1944	6,500,000	100	97	101	99
Central Maine Pwr.	5	1939	4,421,000	100	98	101	98
Central N. Y. Gas & Elec.	5	1941	1,042,500	97	94	100	96
Central States Elec.	6	1945	10,000,000	....	....	98	91
Chattanooga Ry. & Lt.	5	1956	1,726,500	85	81	92	81
Cincinnati Gas & Elec.	5	1956	8,469,000	102	98	104	101
Cincinnati Gas & Elec.	5½	1961	5,818,000	105	100	105	102
Cities Service	6	1966	25,000,000	91	90	97	91
Cities Service (B)	7	1966	725,730	178	150	189	178
Cities Service (C)	7	1966	....	128	111	131	125
Cities Service (D)	7	1966	14,980,380	106	98	122	101
Cities Service (E)	8	1966	2,007,920	112	111	132	109
Cities Service Pwr. & Lt.	6	1944	24,437,500	95	93	97	94
City Lt. & Trac., Sedalia Mo.	5	1952	1,395,000	85	74	89	83
Cleveland Elec. Illum.	5	1939	18,500,000	102	100	104	102
Cleveland Elec. Illum.	5	1954	11,500,000	101	97	104	102
Cleveland Elec. Illum.	7	1941	5,000,000	111	109	112	110
Colorado Pwr.	5	1953	4,169,200	96	93	98	95
Columbia Gas & Elec.	5	1927	2,588,140	100	99	101	99
Columbia Ry. Gas & Elec.	5	1936	4,876,000	94	92	96	92
Columbus Dela & Marion Elec.	5	1937	1,665,000	88	83	88	83
Columbus Dela & Marion Elec.	6	1937	2,000,000	98	91	97	93
Columbus Elec. & Pwr.	6	1947	1,442,300	....	....	....	....
Columbus Ry. Pwr., & Lt.	5	1940	4,682,000	98	93	99	97
Columbus Ry. Pwr., & Lt.	6	1941	6,188,000	105	101	107	104
Commonwealth Edison	5	1943	45,774,000	102	99	104	102
Commonwealth Edison	5	1953	15,000,000	101	98	104	99
Commonwealth Edison	5	1954	12,000,000	101	98	104	99
Commonwealth Pwr.	5	1939	2,184,500	....	....	....	....
Commonwealth Pwr.	6	1972	1,061,000	....	....	....	....
Commonwealth Pwr.	6	1947	9,526,700	103	97	102	102
Community Pwr. & Lt.	6	1950	4,000,000	98	94	101	98
Conn. Ry. & Ltg.	4½	1951	13,257,000	92	90	94	90
Consol. Cities Lt. Pwr. & Trac.	5	1962	10,000,000	82	75	86	80
Consol. Elec.	5	1955	1,533,950	98	94	99	98
Consol. Gas of N. Y.	5½	1945	50,000,000	105	101	106	104
Con. Gas Elec. Lt. & Pwr. of Balti.	4½	1935	13,845,000	97	93	99	97
Con. Gas Elec. Lt. & Pwr. of Balti.*	6	1949	11,062,500	108	104	108	105
Con. Gas Elec. Lt. & Pwr. of Balti.	5	1965	8,964,000	100	99	102	100
Con. Gas Elec. Lt. & Pwr. of Balti.*	5½	1952	4,998,000	105	102	107	105
Consumers Elec. Lt. & Pwr.	5	1936	1,885,000	96	93	99	96
Consumers Pwr.	5	1936	22,254,000	100	99	102	100
Consumers Pwr.	5	1952	16,872,700	100	90	103	97
Consumers Pwr.	5½	1954	8,318,500	104	99	105	103
Continental Gas & Elec.	5	1927	3,934,100	100	99	101	99
Continental Gas & Elec.	6	1947	5,461,200	101	98	103	100
Continental Gas & Elec.	6½	1964	11,700,000	101	96	102	97
Continental Gas & Elec.	7	1954	3,001,600	103	99	115	104
Cumberland County Pwr. Lt.	5	1942	4,529,000	96	92	97	94
Dallas Pwr. & Lt.	6	1949	6,000,000	105	103	106	104
Dayton Ltg.	5	1937	1,469,000	100	98	101	100
Dayton Pwr. & Lt.	5	1941	9,505,000	100	97	103	100
Defiance Gas & Elec.	5	1942	906,600	97	88	99	98
Denver Gas & Elec.	5	1949	6,098,900	100	97	100	98
Denver Gas & Elec. Lt.	5	1951	9,319,000	97	92	98	94
Des Moines Elec.	5	1938	3,773,000	100	98	101	99
Detroit Edison	5	1933	10,000,000	102	99	103	100
Detroit Edison	5	1940	16,665,000	102	99	108	100
Detroit Edison	5	1949	12,500,000	101	97	104	100
Detroit Edison	5	1955	23,000,000	100	99	104	100
Detroit Edison	6	1932	1,025,200	150	110	135	124
Detroit Edison	6	1940	18,319,000	108	106	108	106
Detroit Edison	7	1928	368,500	156	125	134	124
Detroit Edison	7	1929	409,300	150	114	131	124
Detroit Edison	7	1930	1,091,200	158	121	138	124
Dominion Pwr. & Trans.	5	1932	5,452,000	98	95	97	95
Dubuque Elec.	6	1942	3,200,000	102	97	103	102
Duke-Price Pwr.	6	1966	37,000,000	....	....	104	100
Duquesne Lt.	6	1949	31,718,500	107	104	107	104
Duquesne Lt.	5½	1949	10,000,000	106	104	106	104
Durham Pub. Serv.	7	1949	1,500,000	101	97	103	99
East Penn Elec.	6	1953	2,500,000	105	100	107	105
East N. J. Pwr.	6	1949	3,550,000	....	....	103	99
East Oregon Lt. & Pwr.	6	1929	1,200,000	100	97	102	100
East Texas Elec.	5	1942	1,857,000	....	....	....	....
Economy Lt. & Pwr.	5	1956	1,269,000	99	96	101	99
Edison Elec. Illum. of Boston*	4½	1928	30,000,000	100	98	101	99
Edison Elec. Illum. of Bklyn.	4	1939	4,275,000	95	89	99	93
Edison Elec. Illum. (N. Y.)	5	1995	2,188,000	103	99	108	103
El Paso Elec.	5	1950	3,000,000	96	95	99	95
Elec. Pwr. Corp. (Germany)	6½	1950	7,500,000	88	86	98	85
Elmira Water, Lt. & R.R.	5	1956	4,741,000	96	92	98	96
Empire Dist. Elec.	5	1949	3,571,000	91	86	101	92
Erie Ltg.	5	1967	3,034,000	99	95	101	99
Evansville Gas & Elec. Lt.	5	1932	1,105,000	100	96	101	99
Federal Lt. & Trac.	5	1942	3,323,000	96	88	93	92
Federal Lt. & Trac.	6	1942	3,482,000	103	96	104	100
Federal Lt. & Trac.	6	1954	2,500,000	94	91	98	93
Florida Pwr. & Lt.	5	1954	42,000,000	....	....	95	91
Florida Pub. Serv.	6	1955	2,647,000	....	....	99	97
Florida Pub. Serv.	6½	1949	1,550,000	103	99	103	99
Ft. Smith Lt. & Trac.	5	1936	3,051,000	82	76	89	75
Ft. Worth Pwr. & Lt.	5	1931	3,490,000	100	99	101	99
Galveston Elec.	5	1940	1,118,000	93	86	92	86
General Elec.	3½	1942	....	90	83	92	87
Georgia Carolina Pwr.	5	1952	3,409,000	90	82	94	87
Georgia Lt., Pwr. & Rys.	5	1941	3,667,000	90	86	104	86
Georgia Ry. & Elec.	5	1932	5,360,000	100	98	100	89
Georgia Ry. & Elec.	5	1949	8,040,000	94	88	98	94
Georgia Ry. & Pwr.	5	1954	11,546,000	96	89	103	96
Georgia Ry. & Pwr.	6	1947	$3,500,000	103	100	107	103
Gerogia Ry. & Pwr.	7	1941	4,000,000	107	105	107	105
Great Cons. Elec. Pwr. (Japan)	6½	1950	13,500,000	86	85	93	85
Great Cons. Elec. Pwr. (Japan)	7	1944	14,250,000	92	87	98	90
Great Falls Pwr.	5	1940	3,045,000	103	99	104	100
Great Northern Pwr.	5	1935	7,747,000	99	96	100	98
Great Western Pwr.	5	1946	19,171,000	99	95	100	98
Great Western Pwr.	5½	1955	8,738,000	99	96	101	99
Great Western Pwr.	6	1949	5,872,300	102	100	104	102
Great Western Pwr.	6	1952	5,919,000	102	99	104	102
Hamburg Elec.	7	1935	4,000,000	96	95	101	94
Havana Elec. Ry., Lt. & Pwr.	5	1954	9,420,000	95	85	105	93
Holtwood Pwr.	6	1954	2,750,000	104	100	105	100
Houston Ltg. & Pwr.	5	1931	2,403,000	100	98	101	99
Houston Ltg. & Pwr.	5	1953	4,000,000	95	90	99	90
Houston Ltg. & Pwr.	5½	1954	2,000,000	102	97	103	99
Hydraulic Pwr.	5	1951	6,500,000	102	99	104	101
Hydraulic Pwr.	5	1950	3,500,000	103	100	103	101
Idaho Pwr.	5	1947	12,200,000	97	93	99	96
Illinois Elec. Pwr.	6	1943	3,432,500	103	99	103	102
Illinois Pwr.	5	1933	3,384,000	95	93	96	93
Illinois Pwr.	6	1944	850,500	....	....	....	....
Illinois Pwr. & Lt.	5½	1954	16,000,000	98½	97½	101	97
Illinois Pwr. & Lt.	6	1953	40,200,000	102	100	104	100
Illinois Pwr. & Lt.	7	1953	8,731,800	102	99	104	102
Indiana Elec.	6	1947	5,338,300	99	97	100	98
Indiana Gen. Serv.	5	1948	4,189,500	97	92	99	96
Indiana Ltg.	4	1958	3,018,000	83	78	85	82
Indiana & Michigan Elec.	5	1955	11,283,000	98	95	98	96
Indiana & Michigan Elec.	5	1957	5,959,000	99	97	100	97
Indiana Serv.	5	1950	7,513,386	92	86	95	91
Indiana Serv.	6	2020	4,795,533	88	73	92	83
International Pwr. Sec.	6½	1955	10,000,000	....	....	....	....
Interstate Elec.	6	1933	1,745,500	99	95	98	94
Interstate Pwr.	6	1944	6,000,000	99	95	102	98
Interstate Pwr.	7	1934	2,500,000	101	97	102	100
Interstate Pub. Serv.	6	1948	8,551,900	100	96	100	98
Iowa Ry. & Lt.	5	1932	6,572,000	99	97	100	97
Iowa Southern Utilities	5½	1950	5,410,400	98	93	96	94
Jersey Central Pwr. & Lt.	5½	1945	17,000,000	98	95	98	95
Kansas City Pwr. & Lt.	5	1952	25,000,000	102	95	104	100
Kansas Elec. Pwr.	6	1937	3,000,000	102	97	104	100
Kansas Elec. Pwr.	6	1943	1,500,000	102	97	103	98
Kansas Gas & Elec.	6	1952	14,000,000	103	98	106	101
Kansas Gas & Elec.	6	2022	3,000,000	94	86	96	92
Kentucky Hydro-Elec.	6	1949	4,000,000	101	100	102	99
Kentucky Utilities	6	1949	4,500,000	101	97	105	99
Kings County Elec. Lt. & Pwr.	5	1937	2,500,000	103	99	104	102
Kings County Elec. Lt. & Pwr.	6	1997	5,176,000	120	114	124	120
Knoxville Ry. & Lt.	5	1946	3,248,000	95	88	98	95
Laclede Gas Lt.	5	1934	10,000,000	101	98	103	100
Laclede Gas Lt.	5½	1953	17,500,000	102	95	105	102
Laurentian Pwr.	6	1936	1,048,200	100	96	101	100
Laurentide Pwr.	5	1946	6,869,000	100	97	102	100
Lehigh Pwr. Sec.	6	2026	25,000,000	....	....	95	93
Lincoln Gas & Elec.	5	1941	1,500,000	95	92	97	92
Long Island Ltg.	5	1936	4,873,000	100	98	101	99
Long Island Ltg.	6	1948	3,000,000	105	102	108	104
Los Angeles Gas & Elec.	5	1939	5,047,000	101	98	102	99
Los Angeles Gas & Elec.	5½	1943	3,809,000	99	94	106	99
Los Angeles Gas & Elec.	5½	1947	4,999,500	99	96	106	99
Los Angeles Gas & Elec.	5½	1949	10,847,500	99	95	105	99
Los Angeles Gas & Elec.	6	1942	4,000,000	104	101	110	102
Louisiana Pwr.	6	1944	2,250,000	99	97	104	98
Louisville Gas & Elec.	6	1937	5,343,100	....	....	102	100
Louisville Gas & Elec.	5	1952	18,805,000	99	90	101	97
Louisville Gas & Elec.	5½	1954	3,000,000	103	99	104	102
Lower Austrian Hydro-Elec.	6½	1944	3,000,000	87	85	88	82
Luzerne County Gas & Elec.	5	1948	3,477,000	99	97	101	97
Luzerne County Gas & Elec.	7	1944	3,000,000	104	99	111	103
Luzerne County Gas & Elec.	6	1954	6,000,000	105	99	105	102
Madison River Pwr.	5	1935	1,774,000	101	99	102	100
Manila Elec. Ry. & Ltg.	5	1953	3,763,000	92	85	98	89
Manitoba Pwr.	5½	1951	10,000,000	....	....	98	94
Memphis Pwr. & Lt.	5	1948	7,500,000	99	95	101	99
Metropolitan Edison	6	1952	6,080,000	106	101	108	104
Metropolitan Edison	5	1953	6,650,000	97	91	101	95
Metropolitan Pwr.	6	1953	3,250,000	104	100	106	102
Michigan Lt.	5	1946	2,512,000	100	97	102	99
Michigan No. Pwr.	5	1941	3,530,250	98	95	101	97
Milwaukee Elec. Ry. & Lt.	4½	1931	6,728,000	97	94	99	96
Milwaukee Elec. Ry. & Lt.	5	1951	5,819,000	100	94	101	98
Milwaukee Elec. Ry. & Lt.	5	1961	14,321,500	92	84	100	90
Milwaukee Elec. Ry. & Lt.	6	1953	8,451,000	104	98	105	101
Minnesota Pwr. & Lt.	5	1955	6,500,000	97	95	99	95
Minnesota Pwr. & Lt.	6	1950	12,300,000	105	101	106	104
Mississippi Pwr.	5	1955	5,750,000	93	91	94	92
Mississippi River Pwr.	5	1951	18,059,700	100	96	101	99
Mississippi River Pwr.	7	1935	2,575,700	104	102	103	102
Missouri Edison Elec.	5	1927	3,168,000	100	99	100	100
Missouri Pwr. & Lt.	5½	1955	6,500,000	....	....	98	96
Mobile Elec.	5	1946	2,194,000	97	91	99	97
Monongahela West Pa., Pub. Serv.	5½	1953	14,171,000	98	95	97	95
Montana Pwr.	5	1943	25,384,500	100	97	105	99
Montreal Lt. Ht. & Pwr.	4½	1932	6,326,000	98	97	98	97
Montreal Lt. Ht. & Pwr.	5	1933	2,832,000	101	98	101	99
Montreal Pub. Serv.	5	1942	2,968,000	94	89	97	94
Mountain States Pwr.	6	1938	6,659,000	100	96	101	98
Municipal Serv.	5	1942	4,527,700	96	92	93	92
Nashville Ry. & Lt.	5	1953	3,573,000	98	94	98	96
Nashville Ry. & Lt.	5	1958	2,612,500	92	84	95	90
Nassau Lt. & Pwr.	5	1927	756,000	101	98	100	98
Nassau & Suffolk Ltg.	5	1945	2,828,500	91	82	96	89
National Elec. Pwr.	6	1945	8,750,000	97	92	98	92
National Pwr. & Lt.	7	1972	8,417,000	104	97	....	....
National Pub. Serv.	6½	1955	2,939,480	96	94	98	94
Nebraska Pwr.	5	1949	8,600,000	100	97	103	99
Nebraska Pwr.	6	2022	3,500,000	97	89	101	94
Nevada-California Elec.	6	1946	9,341,800	100	96	....	....
Nevada-California Elec.	6	1950	8,804,000	100	96	102	98

*Notes. †Closing date Dec. 15.

	Rate	Due	Amount Issued	Market Record 1925 H.	1925 L.	1926† H.	1926† L.
New Brunswick Pwr.	5	1937	1,821,000	82½	81	90	81
New England Pwr.	5	1951	12,697,000	103	100	104	100
New Jersey Pwr. & Lt.	5	1936	2,689,000	97	92	101	96
New Orleans Pub. Serv.	4½	1935	13,300,300	88	83	91	87
New Orleans Pub. Serv. (A)	5	1952	12,000,000	92	89	96	90
New Orleans Pub. Serv.	5	1955	5,000,000	92	88	96	90
New Orleans Pub. Serv.	6	1949	4,776,200	93	86	96	90
New York & Queens Elec. Lt. & Pwr.	5	1930	2,350,000	101	99	103	100
New York & Westchester Ltg.	4	2004	10,000,000	81	76	82	79
New York & Westchester Ltg.	5	1954	2,500,000	97	93	99	97
New York Edison.	6½	1941	30,000,000	115	112	118	115
New York Edison.	5	1944	30,000,000	102	99	104	102
New York Gas & Elec. L., H. & P.	5	1948	15,000,000	104	100	106	104
New York Gas & Elec. L., H. & P.	4	1949	20,888,000	90	86	92	89
New York State Gas & Elec.	5½	1962	4,215,000	101	96	103	100
Newport News & Hampton Ry., Gas & Elec.	5	1944	3,745,500	93	84	91	89
Niagara Falls Pwr.	5	1932	9,485,500	103	99	103	100
Niagara Falls Pwr.	6	1932	7,525,000	106	103	106	104
Niagara Falls Pwr.	6½	1950	10,000,000	106	105	107	104
Niagara Lock & Ont. Pwr.	5	1955	15,000,000	100	97	101	99
Norfolk Ry. & Lt.	5	1949	4,104,000	95	93	99	94
North American Edison	6	1952	13,160,000	103	96	105	101
North American Edison	6½	1948	7,760,000	106	100	106	103
North American Lt. & Pwr.	7	1954	7,408,600	100	97	100	99
North Carolina Pub. Serv.	5	1934	2,324,300	93	89	98	92
North Carolina Pub. Serv.	6	1954	570,500	96	91	97	94
North Shore Elec.	5	1940	1,676,500	100	97	101	98
North California Pwr.	5	1948	3,977,000	100	98	101	99
North Indiana Gas & Elec.	5	1929	2,455,000	100	97	100	99
North Indiana Gas & Elec.	6	1952	7,000,000	103	99	105	102
Northern New York Utilities	5	1955	2,125,500	....	....	99	95
Northern New York Utilities	5½	1949	1,750,000	100	96	102	100
No. Ohio Trac. & Lt.	4	1933	3,219,000	87	82	92	87
No. Onio Trac. & Lt.	5	1956	4,466,000	87	78	87	84
No. Ohio Trac. & Lt.	6	1947	9,788,000	97	91	99	92
No. States Pwr.	6½	1933	4,705,900	141	105	131	108
No. States Pwr.*	6½	1933	6,311,500	104	99	104	102
No. States Pwr.	6	1948	14,270,000	104	101	104	103
No. States Pwr.	6	1941	7,492,500	107	103	106	104
No. States Pwr.	5	1941	26,560,500	99	93	101	97
No. Texas Elec.	5	1940	3,231,000	82	74	76	72
Northwestern Elec.	6	1935	7,143,800	102	101	103	102
Northwestern Pub. Serv.	6½	1948	3,274,600	100	97	102	99
Nova Scotia Tram. & Pwr.	5	1946	2,250,000	89	84	90	86
Ohio Pwr.	5	1952	13,794,500	96	89	99	94
Ohio Pwr.	6	1953	10,000,000	104	101	105	103
Ohio Pwr.	6	2024	2,000,000	95	88	99	95
Ohio Pwr.	7	1951	9,702,000	107	105	106	105
Ohio Pub. Serv.	5	1954	11,790,700	93	87	100	92
Ohio Pub. Serv.	6	1953	4,637,600	101	99	107	101
Ohio Pub. Serv.	7½	1946	4,682,600	112	108	116	112
Ohio Pub. Serv.	7	1947	3,714,100	111	107	119	110
Ohio River Edison.	6	1948	6,958,000	104	98	106	101
Oklahoma Gas & Elec.	5	1950	27,500,000	95	91	95	93
Oklahoma Gas & Elec.	6	1940	9,500,000	98	95	97	96
Ontario Pwr. of Niagara Falls	5	1943	8,980,000	100	98	102	99
Ontario Transmission	5	1945	1,568,000	99	97	101	99
Ozark Pwr. & Water	5	1952	2,000,000	79	75	88	77
Pacific Coast Pwr.	5	1940	3,990,000	100	98	101	99
Pacific Gas & Elec.	5	1942	35,797,000	99	93	100	97
Pacific Gas & Elec.	5½	1952	45,000,000	102	99	104	101
Pacific Gas & Elec.	6	1941	20,000,000	106	103	108	106
Pacific Lt. & Pwr.	5	1942	2,903,000	101	98	103	100
Pacific Lt. & Pwr.	5	1951	6,070,000	100	98	103	100
Pacific Pwr. & Lt.	5	1930	9,119,000	100	98	101	99
Parr Shoals Pwr.	5	1952	2,679,000	97	92	98	95
Paterson & Passaic Gas & Elec.	5	1949	4,049,000	100	96	102	100
Penn Central Lt. & Pwr.	5½	1975	5,500,000	....	....	98	94
Penn Central Lt. & Pwr.	6	1953	10,300,000	104	102	105	102
Penn-Ohio Edison.	6	1950	6,000,000	98	97	116	98
Penn-Ohio Elec.	6½	1938	2,637,400	105	99	107	105
Penn-Ohio Pwr. & Lt.	5½	1954	19,000,000	99	95	101	98
Penn-Ohio Pwr. & Lt.	6	1939	2,700,000	99	94	99	97
Penn Pwr. & Lt.	5	1952	7,000,000	98	95	100	97
Penn Pwr. & Lt.	5	1953	18,000,000	98	95	100	97
Penn Pwr. & Lt.	6	1953	4,000,000	105	102	106	105
Penn Pwr. & Lt.	7	1951	8,000,000	107	105	106	105
Penn Pub. Serv.	5	1954	4,000,000	96	93	98	96
Penn Pub. Serv.	6	1947	7,000,000	105	103	107	103
Penn Water & Pwr.	5	1940	11,602,000	102	99	102	101
Penn Water & Pwr.	5½	1953	3,000,000	103	100	104	102
Philadelphia Co.	6	1944	12,545,100	105	101	105	103
Philadelphia Co.	5½	1938	9,967,000	100	93	101	93
Philadelphia Co.	5	1951	12,629,000	97	93	99	97
Philadelphia Co.	5	1949	2,175,000	104	94	104	103
Philadelphia Elec.	5	1966	38,335,000	104	100	105	102
Philadelphia Elec.	4	1966	38,335,000	85	83	88	84
Philadelphia Elec.	5	1960	12,500,000	104	100	104	102
Philadelphia Elec.	6	1941	12,033,800	108	104	108	105
Philadelphia Elec.	5½	1947	7,283,700	107	103	108	103
Philadelphia Elec.	5½	1953	9,811,800	107	104	108	104
Philadelphia Elec. Pwr.	5½	1972	36,000,000	....	....	103	100
Portland Elec. Pwr.	6	1947	6,250,500	100	96	104	99
Portland Gen. Elec.	5	1935	7,146,000	100	98	102	99
Portland Ry. Lt. & Pwr.	5	1942	11,818,300	92	84	94	88
Portland Ry. Lt. & Pwr.	6	1947	5,480,600	100	94	103	99
Portland Ry. Lt. & Pwr.	7½	1946	4,319,500	108	104	108	105
Potomac Edison.	6	1949	1,000,000	100	96	102	99
Potomac Edison.	6½	1948	2,000,000	103	99	104	103
Potomac Elec. Pwr.	5	1929	1,700,000	100	99	101	99
Potomac Elec. Pwr.	5	1936	4,041,000	100	98	100	99
Potomac Elec. Pwr.	6	1953	4,000,000	....	....	....	....
Potomac Elec. Pwr.	7	1941	1,687,000	....	....	....	....
Power Corp. of New York	6	1942	990,000	101	97	103	101
Power Corp. of New York	6½	1942	4,888,000	105	101	105	104
Power Securities.	6	1949	1,668,800	....	....	....	....
Pub. Lt. & Pwr.	5	1945	2,100,000	79	64	78	60
Pub. Serv. Co. of Colo.	5½	1954	11,833,100	96	92	98	95
Pub. Serv. Co. of Colo.	6	1953	3,541,900	101	98	101	100
Pub. Serv. Co. of Colo.	7	1933	1,949,000	102	98	102	101
Pub. Serv. Corp. of N. J.	6	1944	19,698,000	101	95	106	101
Pub. Serv. Co. of No. Ill.	5	1956	18,926,000	97	91	100	98
Pub. Serv. Co. of No. Ill.	5½	1962	22,250,000	102	96	106	103
Pub. Serv. Co. of No. Ill.	5½	1964	5,000,000	102	96	106	103
Pub. Serv. of Okla.	6	1949	3,275,000	101	97	102	98
Pub. Serv. Elec. & Gas.	5½	1959	25,714,000	105	98	106	103
Pub. Serv. Elec. & Gas.	5½	1964	15,000,000	105	99	105	103
Pub. Util. Evansville (Ind.)	6	1929	2,754,900	101	99	101	99
Puget Sound Pwr.	5	1933	2,450,000	100	98	101	99
Puget Sound Pwr. & Lt.	5½	1949	28,500,000	100	96	101	100
Quebec Pwr.	6	1953	3,540,000	102	98	104	101
Queensborough Gas & Elec.	5	1952	1,600,000	100	96	102	99
Queensborough Gas & Elec.	6	1953	2,000,000	105	101	106	104
Quincy (Ill.) Gas, Elec. & Ht.	5	1935	1,400,000	94	89	96	93
Rhine-Westphalia Elec. Pwr.	7	1950	10,000,000	96	94	101	95
Rio de Janeiro Tram. Lt. & Pwr.	5	1935	25,000,000	93	85	95	94
Rochester Gas & Elec.	5½	1948	4,000,000	105	102	106	103
Rochester Gas & Elec.	7	1946	7,000,000	112	110	114	111
Rochester Ry. & Lt.	5	1954	10,921,000	101	99	103	100
Rockford Elec.	5	1939	2,447,000	101	98	100	99
St. Maurice Pwr.	6½	1953	9,026,000	109	107	109	107
St. Paul Gas Lt.	5	1944	5,000,000	101	98	102	100
St. Paul Gas Lt.	5½	1954	2,650,000	102	98	103	101
St. Joseph Ry. Lt. Ht. & Pwr.	5	1937	5,000,000	93	85	97	91
Salt River Valley Water	6	1938	1,800,000	....	....	....	....
Salmon River Pwr.	5	1952	4,273,000	101	98	102	100
San Antonio Gas & Elec.	5	1949	984,000	98	96	98	96
San Antonio Pub. Serv.	6	1952	5,550,000	104	99	106	101
San Diego Con. Gas & Elec.	5	1939	5,680,000	101	98	102	100
San Diego Con. Gas & Elec.	6	1939	2,750,000	103	99	104	101
San Joaquin Lt. & Pwr.	5	1945	2,243,000	100	98	102	98
San Joaquin Lt. & Pwr.	6	1950	14,226,000	103	101	104	103
San Joaquin Lt. & Pwr.	6	1952	9,633,000	103	99	108	99
San Joaquin Lt. & Pwr.	6	1954	1,500,000	101	99	104	100
Savannah Elec. & Pwr.	7½	1941	1,717,500	....	....	....	....
Saxon Pub. Wks. (Germany)	7	1945	7,000,000	94	90	102	92
Scranton Elec.	5	1937	6,007,000	101	99	102	101
Seattle Elec.	5	1930	2,731,000	101	99	101	100
Seattle Elec.	5	1929	4,975,000	100	99	100	99
Seattle Elec.	5	1939	2,541,000	93	90	94	92
Seattle Ltg.	5	1949	7,633,500	93	85	95	90
Shawinigan Wtr. & Pwr.	5	1934	3,638,000	101	100	101	100
Shawinigan Wtr. & Pwr.	5½	1950	6,000,000	104	101	105	103
Shawinigan Wtr. & Pwr.	6	1950	5,177,000	106	104	105	104
Sheboygan Elec.	5	1946	1,482,500	97	94	98	94
Siemens & Halske.	7	1928	.....	99	92	101	96
Siemens & Halske.	7	1935	.....	96	90	102	94
Sierra & San Francisco Pwr.	5	1949	8,456,000	80	75	83	75
Sierra and San Francisco Pwr.	6	1949	1,000,000	93	87	95	90
Sioux City Gas & Elec.	6	1947	3,500,000	102	99	104	101
Sioux City Gas & Elec.	6	1949	2,550,000	102	99	104	102
South Carolina Gas & Elec.	6	1942	3,628,000	93	87	97	78
South Carolina Gas & Elec.	6	1932	644,000	88	78	84	70
Southeastern Pwr. & Lt.	6	2025	39,738,900	91	88	97	89
Southern California Edison.	5	1939	13,360,000	101	99	102	100
Southern California Edison.	5	1944	10,000,000	96	92	101	98
Southern California Edison.	5½	1944	10,225,000	102	98	105	103
Southern California Edison.	6	1943	26,500,000	104	100	105	102
Southern Colorado Pwr.	6	1947	6,893,000	99	93	103	97
Southern Indiana Gas & Elec.	6	1947	1,297,100	....	....	....	....
Southern Pwr.	5	1930	7,000,000	101	99	101	100
Southern Pub. Utilities.	5	1943	8,487,000	100	97	101	100
Southern Wisconsin Pwr.	5	1938	2,097,000	93	88	94	91
Southwestern Gas & Elec.	5	1932	4,045,500	98	94	98	97
Southwestern Gas & Elec.	6	1957	4,134,500	98	89	99	97
Southwestern Lt. & Pwr.	6	1937	3,100,000	97	94	102	98
Southwest Pwr.	6	1944	1,400,000	98	96	98	96
Southwestern Pwr. & Lt.	5	1943	10,797,000	97	90	97	94
Southwestern Pwr. & Lt.	6	2022	5,000,000	94	88	99	94
Southwestern Pub. Serv.	6	1945	3,727,000	99	94	98	94
Southwestern Utilities	8	1936	1,019,700	102	96	96	92
Springfield Lt., Ht. & Pwr.	5	1933	1,307,000	....	....	100	99
Standard Elec. of California	5	1939	1,594,900	100	98	102	99
Standard Gas & Elec.	6	1935	15,000,000	101	91	100	99
Staten Island Edison.	6½	1953	3,734,700	106	104	107	106
Superior Water, Lt. & Pwr.	4	1931	1,346,000	95	93	95	94
Syracuse Lt.	5	1951	2,500,000	101	97	103	100
Syracuse Lt.	5½	1954	6,901,000	103	100	106	103
Tampa Elec.	5	1933	898,500	....	....	....	....
Tennessee Elec. Pwr.	6	1947	24,786,500	104	99	106	102
Tennessee Pwr.	5	1962	2,256,000	96	90	97	96
Texas Pwr & Lt.	5	1937	15,005,000	99	97	102	98
Texas Pwr. & Lt.	6	2022	2,000,000	97	90	100	95
Tide Water Pwr.	6	1942	4,370,500	101	98	104	100
Tide Water Pwr.	7	1937	1,461,900	101	97	107	100
Toho Elec. Pwr. (Japan)	7	1955	14,875,000	91	87	98	90
Tokyo Elec. (Japan)	6	1928	24,000,000	99	96	99	96
Toledo Edison.	5	1947	2,690,000	100	97	101	100
Toledo Edison.	7	1941	13,500,000	110	108	109	107
Toledo Gas, Elec. & Htg.	5	1935	1,875,400	100	97	101	98
Toledo Trac., Lt. & Pwr.*	5½	1930	8,500,000	100	97	101	98
Topeka Edison.	5	1930	617,000	100	97	100	99
Topeka Ry. & Lt.	5	1933	1,207,200	96	90	98	94
Trenton Gas & Elec.	5	1949	1,998,000	100	98	102	100
Tri-City Ry. & Lt.	5	1930	19,760,000	99	96	99	98
Twin State Gas & Elec.	5	1953	2,004,400	94	84	100	95
Twin State Gas & Elec.	5½	1945	1,923,300	98½	96	102	98
Tyrol Hydro-Elec. Pwr.	7½	1955	3,000,000	97	94	98	94
Ujigawa Elec. Pwr.	7	1945	14,000,000	92	90	96	92
Union Elec. Lt. & Pwr.	5	1932	6,200,000	102	99	102	100
Union Elec. Lt. & Pwr.	5	1933	11,026,000	101	98	102	100
Union Elec. Lt. & Pwr.	5	1954	4,850,000	100	97	101	99
United Elec. of N. J.	4	1949	17,934,500	88	85	89	87
United Elec. Lt. & Pwr.	4½	1929	4,428,000	99	98	99	98
United Lt. & Pwr.*	5½	1928	5,000,000	100	98	100	99
United Lt. & Pwr.	5½	1959	6,900,000	97	90	98	96
United Lt. & Pwr.	6½	1974	6,000,000	97	92	99	95
United Lt. & Rys.	5	1932	11,000,000	97	92	97	96
United Lt. & Rys.	6	1926	1,988,000	101	100	101	100
United Lt. & Rys.	6	1952	11,010,000	100	95	101	99
United Lt. & Rys.	6	1973	2,800,000	92	87	93	89

* Notes. † Closing date Dec. 15.

	Rate	Due	Amount Issued	Market Record 1925 H.	1925 L.	1926† H.	1926† L.
United Pwr. & Lt.	6	1944	$4,600,000	103	99	103	102
United Water, Gas & Elec.	5	1941	1,593,600	94	92	97	94
Utah Lt. & Trac.	5	1944	12,471,300	91	83	94	86
Utah Pwr. & Lt.	5	1944	25,847,000	98	91	99	95
Utah Pwr. & Lt.	6	1944	5,500,000	104	102	104	102
Utah Pwr. & Lt.	6	2022	5,000,000	94	88	98	88
Utica Elec. Lt. & Pwr.	5	1950	647,000	102	100	102	100
Utica Gas & Elec.	5	1957	4,610,000	103	98	102	100
Utica Gas & Elec.	5½	1949	3,300,000	103½	101	104	103
Vermont Hydro-Elec.	6	1929	1,881,500	100	98	101	100
Vicksburg Lt. & Trac.	5	1932	763,000	93	89	99	93
Virginian Pwr.	5	1942	5,768,000	96	88	101	88
Washington Coast Utilities.	6	1941	1,823,800	101	99	104	102
Washington Ry. & Elec.	4	1951	10,914,200	....	....	....	....
Washington Ry. & Elec.	6	1933	1,791,000	....	....	....	....
Washington Wtr. Pwr.	5	1939	5,279,000	101	99	102	101
West Pennsylvania Pwr.	5	1963	12,500,000	100	93	103	99
West Pennsylvania Pwr.	5	1946	8,500,000	100	93	103	99
West Pennsylvania Pwr.	5½	1953	7,500,000	105	100	106	104
West Virginia Lt., Ht. & Pwr.	6	1929	500,000	101	95	102	100
West Virginia Utilities.	6	1935	1,545,600	98	91	101	95
Westchester Lt.	5	1950	8,533,000	102	98	103	101
Western Elec.	5	1944	35,000,000	101	98	103	100
Western New York Utilities.	5	1946	$2,461,500	97	90	101	96
Western Pwr.	6½	1954	5,929,500	101	97	102	100
Western Pwr. of Canada	5	1949	5,000,000	....	....	96	94
Western Pub. Serv.	6	1950	4,331,000	99	96	100	98
Western States Gas & Elec.	5	1941	3,597,500	99	95	101	98
Western States Gas & Elec*.	6	1937	5,000,000	97	94	98	94
Western States Gas & Elec.	6	1947	8,850,000	100	97	102	99
Westphalia United Elec. Pwr.	6½	1950	7,500,000	87	87	97	93
Wheeling Elec.	5	1941	2,284,000	99	96	100	99
Wichita Ry. & Lt.	5	1932	1,042,000	88	83	88	83
Winnipeg Elec.	6	1954	7,000,000	98	94	98	96
Wisconsin Elec. Pwr.	5	1954	8,730,000	99	93	100	98
Wisconsin Gas & Elec.	5	1952	4,857,500	100	97	100	99
Wisconsin-Minnesota Lt. & Pwr.	5	1944	9,438,000	96	93	98	95
Wisconsin Pwr., Lt. & Ht.	5	1946	1,308,000	93	87	94	92
Wisconsin Pub. Serv.	6	1952	6,772,000	103	99	102	101
Wisconsin Ry., Lt. & Pwr.	5	1933	2,225,000	93	87	96	94
Wisconsin River Pwr.	5	1941	3,883,000	92	88	95	92
Wolverine Pwr.	7	1943	1,570,000	102	99	104	84
Yadkin River Pwr.	5	1941	7,500,000	99	96	101	99
Yarmouth Lt. & Pwr.	5	1937	240,000	87	82	87	83
Yarmouth Lt. & Pwr.	8	1951	250,000	102	97	102	99

* Notes. †Closing date Dec. 15.

Trends in Electrical Costs

Prices for Labor and Materials Tend to Stabilize at Above Pre-War Level—Specialty Equipment and Labor Show Largest Increases—Composite Costs About 150 per Cent Above 1913 Costs

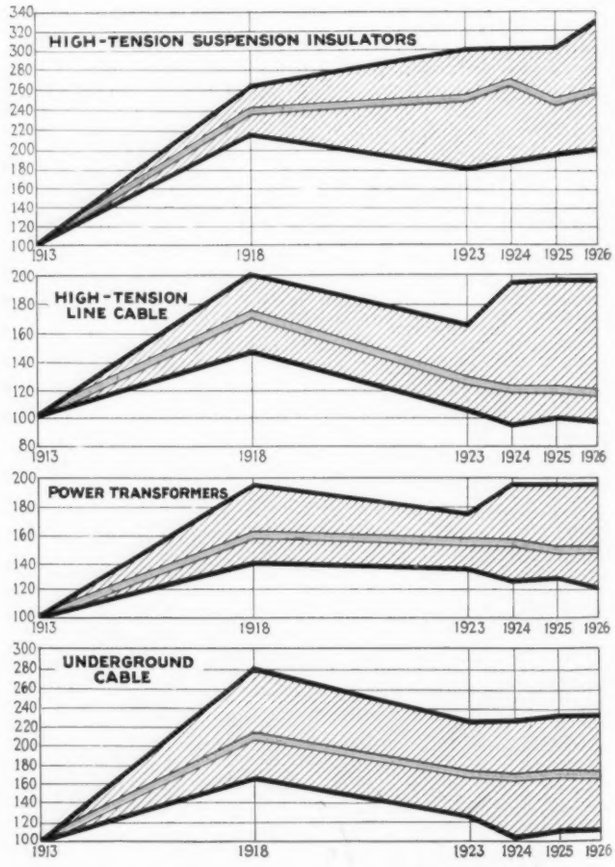
IN THE years from 1910 to 1915 costs were fairly stable in the electrical industry. Then came the war and greatly increased costs combined with wide and rapid fluctuations in costs of particular items. Now that this period has passed, what evidence is there as to present trends in costs in the electrical industry?

A carefully compiled questionnaire was sent to a selected group of light and power utilities. These were located in all sections of the country and several of them own and operate properties in many different sections. With costs in 1913 as an index of 100, they were asked to give the index change in 1918 and for each year since 1923. The resultant curves are plotted in the color graphs to show the trend in price. The cross-hatched area in each curve shows the boundary wherein all reported costs fell and the color line in the center is the average of the indexes for each year as reported.

These costs are valuable only as trends and guides, because local conditions, different manufacturers, freight rates and method of buying affect particular system prices.

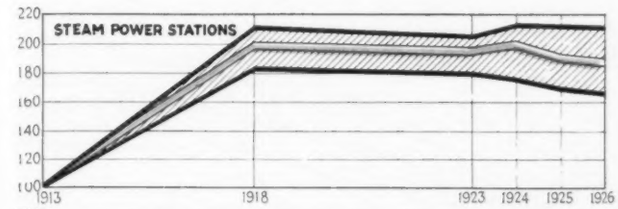
Another valuable feature of the curves lies in the apparent differences in maximum and minimum cost items for particular items. These spreads are too great to be accounted for by local situations or differences in freight rates and show that quality, quantity buying and free competition for business exist as elements in the commercial situation as found in the electrical industry.

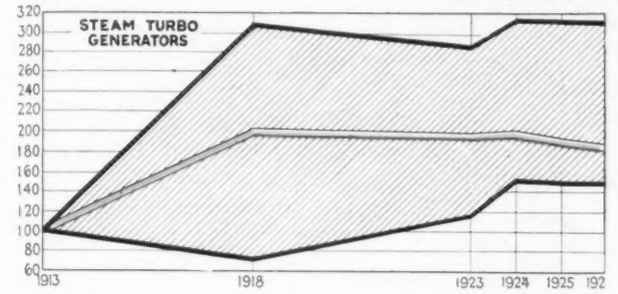
The trend of the curves also gives rise to some speculative thought. Why is the present index so much higher on some items than on others as compared with conditions in 1913? The average index for watt-hour meters is now only 115, as compared with 100 in 1913, yet high-tension suspension insulator units are 255, as against 100 in 1913. To arrive at the complete answer to a question of this character a full analysis of changes in production cost, changes in quality requirements and changes in quantity of production must be made, and it is very unsafe to draw offhand conclusions.

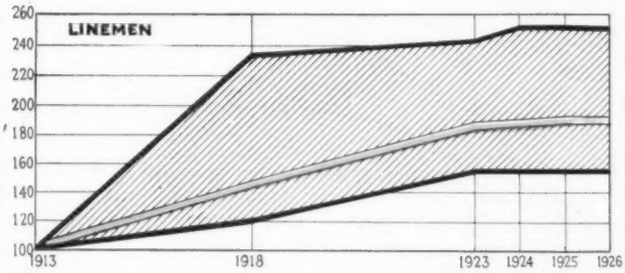


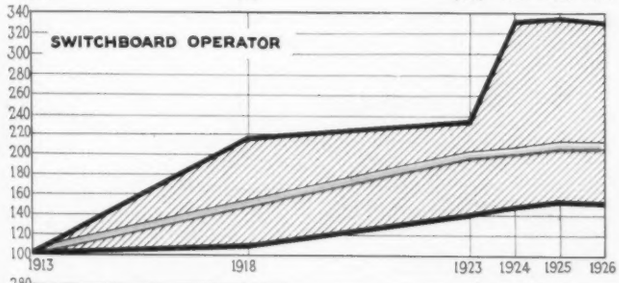
Utility Costs Based on 100 as a 1913 Index

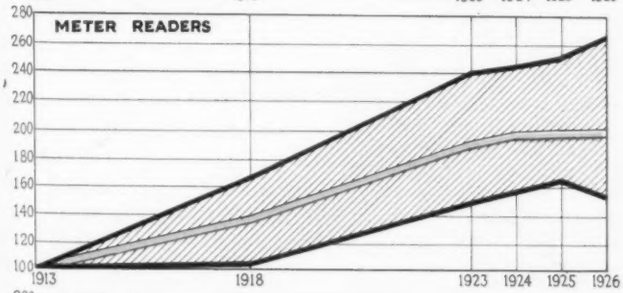
Red line shows average trend, whereas the shaded area within envelope curves indicates the range of price departure from average.

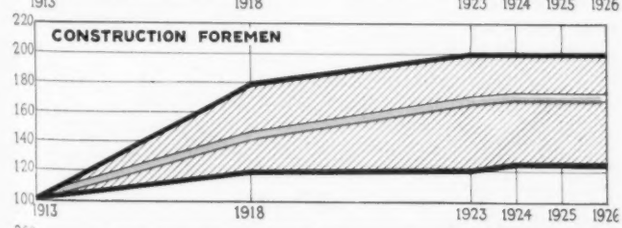


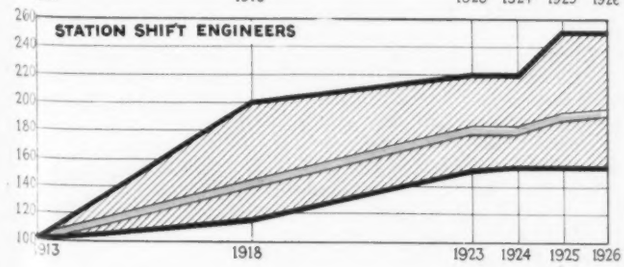


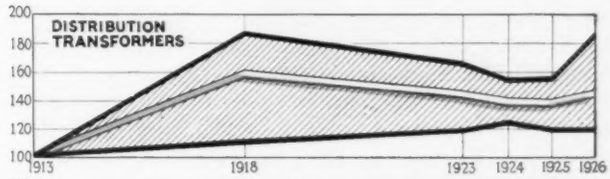


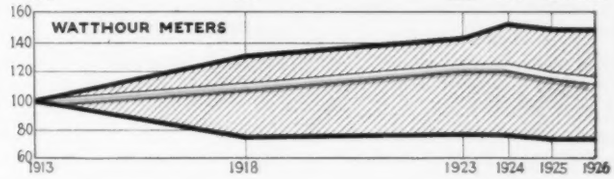


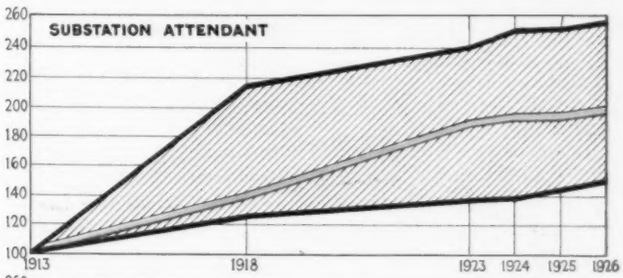


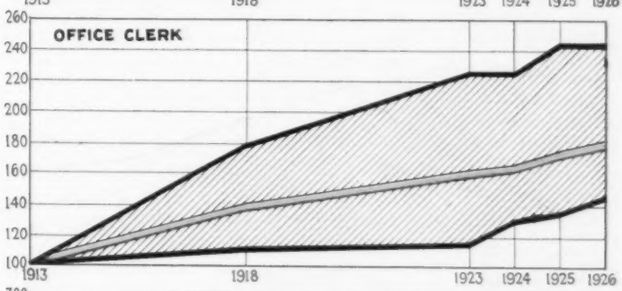


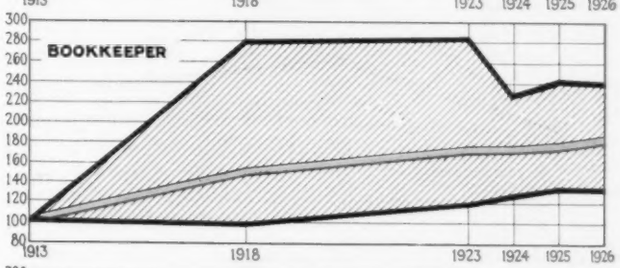


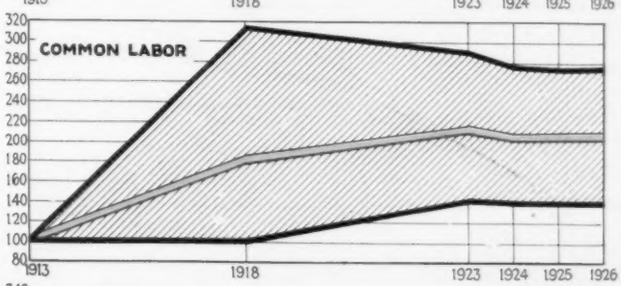


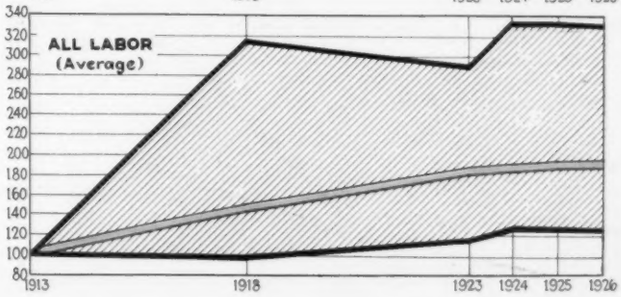






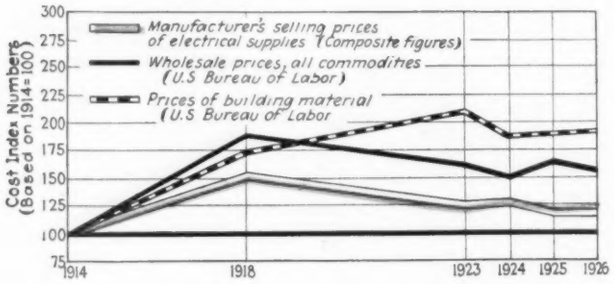


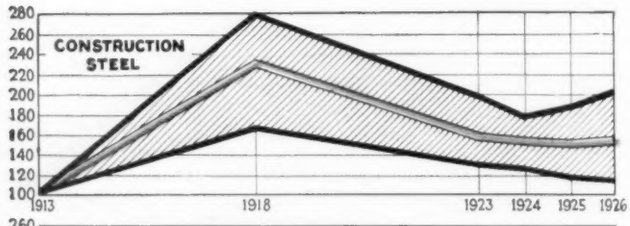


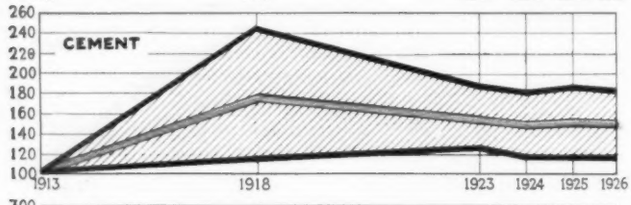


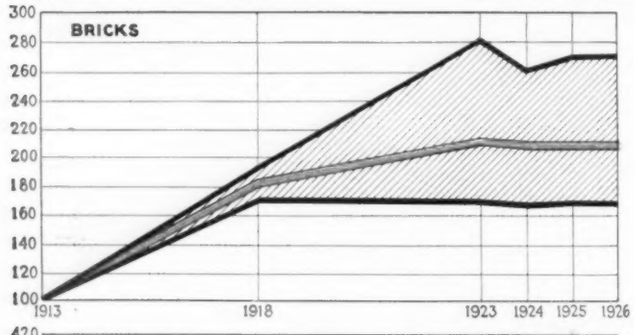
The trend in prices of electrical supplies is shown below and is compared with the wholesale prices of all commodities and the prices of building material. The prices of electrical supplies are the composite of the following thirteen items: Weatherproof wire, pole-line hardware, iron and steel wire and strand, bare copper wire, power apparatus (general purpose motors), incandescent lamps, dry batteries, rubber-covered wire (code), flexible cords, rigid conduit, schedule material, tapes and compounds and standard porcelain. These thirteen items cover a large percentage of the electrical supplies manufactured.

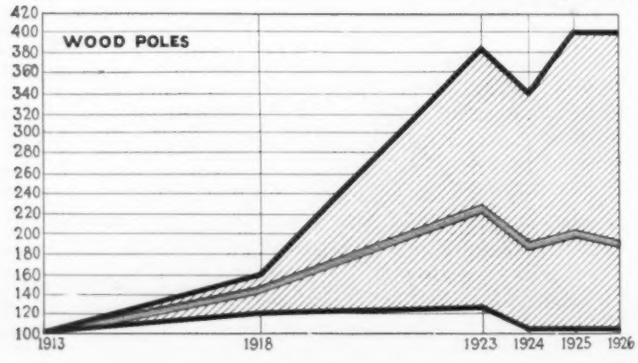
The index figures are weighted in accordance with the volume of sales. For instance, lamps and code wire, having a low index, weight the average heavily because of their large volume, and thus make the composite figure exceptionally low.

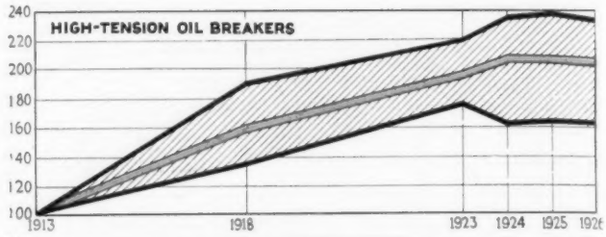


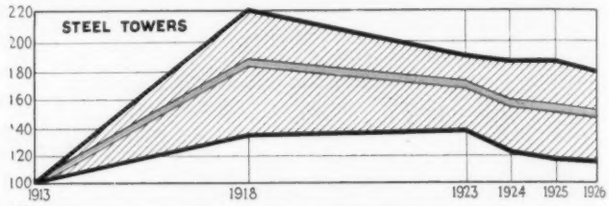


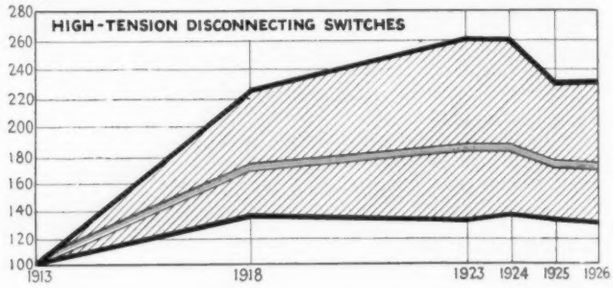


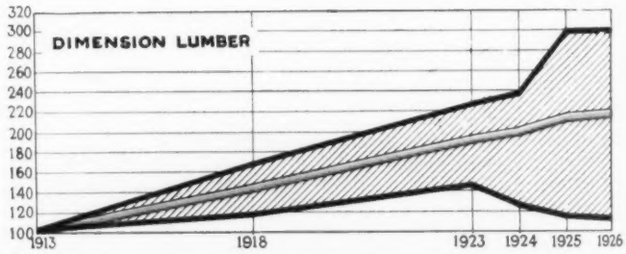


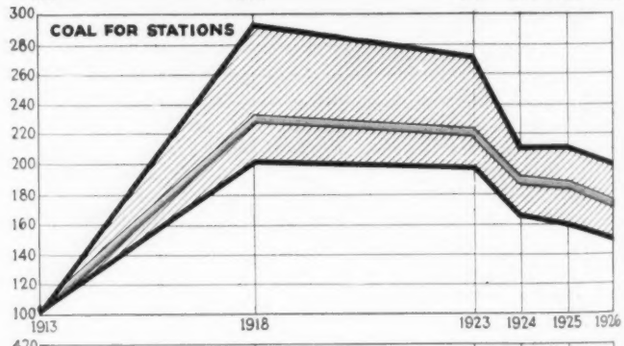


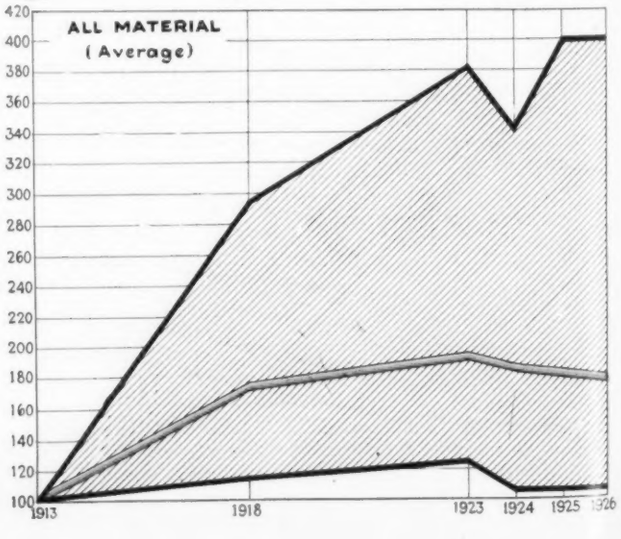












News of the Industry

Southern California Edison Loses Herminghaus Suit

An injunction granted last year against the Southern California Edison Company at the instance of plaintiffs known as the Herminghaus heirs and issued to prevent further storage by the company of floodwaters on the San Joaquin River has been sustained by the Supreme Court of California, the company losing its appeal. This case was explained, with a map of the watershed affected, in the ELECTRICAL WORLD for March 7, 1925 (page 526). Counsel for the Edison company characterize the opinion as "a severe blow to power development in California, such as to give a hold-up value to swamp and overflowed lands."

The decision is sweeping and finds that the plaintiffs are entitled to the full flow of the stream in order to cause it to overflow and deposit silt which makes more productive the 18,000 acres of river land owned by the plaintiffs. The Supreme Court holds that this right outweighs any right of the Southern California Edison Company as a riparian owner or appropriator to store water for power purposes. The decision also holds that the Water Commission act in limiting the landowner as to the quantity of water reasonably necessary for the irrigation of his land when the water is properly applied is unconstitutional and beyond the power of the Legislature.

R. H. Ballard, executive vice-president of the Southern California Edison Company, is quoted as saying that the decision will in no way operate to stop power development on the Big Creek. It merely will require that the company, when providing storage in the future, must acquire any rights adversely affected by such storage. To establish its rights to divert waters of the South Fork of the San Joaquin River and tributary creeks, the company filed on Dec. 27 a condemnation suit against the heirs of the Herminghaus estate. The company asserts that it is the riparian owner of these waters and asks that the Herminghaus estate be limited to a claim to water that is reasonably necessary for the watering of live stock and domestic purposes.

H. L. Clarke Drops Merger of Indianapolis Companies

Action of the Indiana Public Service Commission in granting objectors to merging the two Indianapolis light and power companies a continuance until Jan. 31, in order to make an independent appraisal, means that there will be no unification of the Merchants' Heat & Light Company and the Indianapolis Light & Heat Company, Harley L. Clarke declared, following the decision. Mr. Clarke, who heads the Utilities Power & Light Corporation, of which the new Indianapolis Power & Light Company was to be a subsidiary, sent a telegram from his home in Chicago in which he said: "To me this is unbelievable, but, if true, no unification of these two properties will be possible and consequently no reduction in rates." He concluded with the statement that the people of Indianapolis have the Chamber of Commerce and newspaper criticism to thank for the result.

Mr. Clarke wanted the commission to authorize sale of the two properties before Jan. 10. On this date a contract between Mr. Clarke for the utilities and an Eastern bank must be signed or the merger cannot take place under conditions set out in the amended petition. The bank had agreed to issue, distribute and sell the securities which the commission should authorize for the purchase of the two properties. The petition asked permission to dispose of approximately $55,000,000 of securities.

After the commission announced its decision on the continuance attorneys for the Chamber of Commerce said that Albert S. Richey, electrical engineer of Worcester, Mass., would come to Indianapolis with assistants and begin an appraisal of the two properties. They declined to say if Mr. Clarke's declared intention to stop the merger would halt the appraisal. The Chamber of Commerce, several large power users and civic organizations expect to raise at least $50,000 with which to pay for the appraisal. Whether attorneys for the utilities will withdraw the amended petition pending before the commission has not been disclosed. The decision of the commission was not unanimous. One commissioner thought the time granted too long, another thought it too short, but the three others agreed on Jan. 31.

Congress to Sanction Hydro Investigation

Widespread Surveys of Water-Power Sites to Be Intrusted to Geological Survey—Swing-Johnson Boulder Dam Bill Reported by House Committee

UNDER the river and harbor bill, which is about to become a law at Washington, appropriation is made of $7,322,400 for engineering examinations of all navigable streams and their tributaries upon which power developments appear to be feasible. Provision is made for three types of surveys, according to the importance of the stream. For the more important streams detailed surveys are proposed along with investigations of foundation conditions. In addition, studies are to be made where necessary to determine the locations and capacities of reservoir sites, the locations and practicability of dam sites, the capacities of power sites, the present and prospective power markets available, preliminary estimates of the costs of improvement and the best plan of improvement for all purposes.

On streams where the resources are less important it is proposed to prepare a profile with approximate data as to the sites for reservoirs, dams and power houses. Studies sufficient to determine the probable power markets and the approximate costs and value of the power development would be undertaken. On still other streams only general data would be collected. Important consideration also is to be given to flood control and the possible use of water for irrigation purposes. All streamflow data are to be gathered by the United States Geological Survey, and a portion of the money will be made available to that agency for the expansion necessary in its activities.

In the same bill provision is made for the improvement of the Illinois River to a depth of 9 ft. and to a width of 200 ft. In authorizing the appropriation of $3,500,000 for the project the condition was imposed that "nothing in this act shall be construed as authorizing any diversion of water from Lake Michigan." This condition constitutes the compromise which was reached after extended debate in the Senate over the possible effect on the diversion question of the Illinois River project.

House Committee Reports Boulder Dam Bill

After more than three years of deliberation, the House irrigation committee has reported the Swing-Johnson bill to authorize construction of a flood-control, irrigation and power dam at Boulder Canyon on the Colorado River. Action came after a somewhat heated session. The vote was twelve to three.

By unanimous action, however, a resolution by Representative Sinnott of Oregon was adopted expressing the willingness of the committee to consider carefully any recommendations that may be received from representatives of California, Arizona and Nevada over the formulation of a compact between states in the Colorado River basin.

Governor Hunt Calls Arizona Legislature

A special session of the Arizona Legislature, to meet Jan. 3, has been called by Governor G. W. P. Hunt to enact legislation and make appropriations to conserve the interests of Arizona in the Colorado River and to pro-

vide for its development. It was pointed out in the proclamation calling the special session that little progress was made by the recent conference in Los Angeles of the three lower-basin states looking toward an agreement for development of the river. In the opinion of the present administration in Arizona, the Legislature of that state will not accept the terms laid down by California. The situation is aggravated by approval given to the Swing-Johnson bill at Washington by the House committee on irrigation and reclamation. The regular session of the Arizona Legislature is scheduled for Jan. 10.

Commonwealth Edison Installs Two 66-Kv. Cables

The maximum operating voltage of underground cable on the Commonwealth Edison system in Chicago was increased 100 per cent on Nov. 29, when the new 66,000-volt underground line was put into service between the Northwest and Crawford Avenue generating stations—a distance of 10 miles. A second 66,000-volt line, 5 miles long, was put into operation between Crawford Avenue and Fisk Street stations on Dec. 6, after having operated at 12,000 volts for seven weeks. The 66,000-volt lines have a carrying capacity of 55,000 kw., about four times that of three-conductor, 33,000-volt cable, which previously had the highest capacity on the Commonwealth Edison transmission system. They are the initial installation in the plan of connecting the generating stations by high-capacity 66,000-volt lines.

Next year such a line will be installed between Crawford Avenue station and the Bellwood substation of the Public Service Company to tie into the Joliet generating station. In another year or two a similar line will be installed between Calumet and Crawford stations. Then the superpower system of which Chicago is a part will have continuous lines of extra-high voltage through Chicago.

Muscle Shoals Bill Not to Go Back to Committee

It is now thought at Washington to be virtually certain that the votes cannot be mustered in the Senate to refer the Muscle Shoals bill back to the committee on agriculture. As a result the opposition apparently is concentrating all efforts to delay action so that the bill will die with the Congress on March 4. A campaign directed against the Southern power companies and the electrical industry in general seems to be in progress on the part of a few.

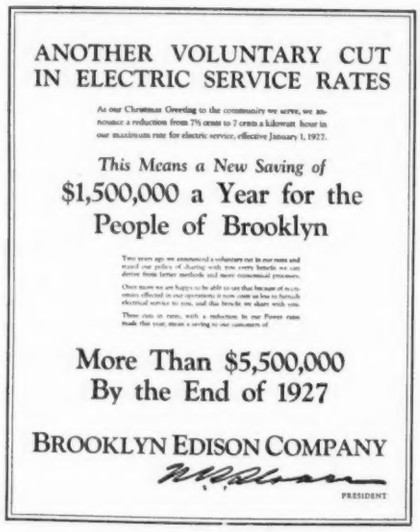
The opposition to the bill is divided into three distinct groups. The first is composed of those who want to see use of the power confined to the vicinity of Muscle Shoals; the second is opposed to the disposition of the properties to any private interest, and the third is opposed to the indirect subsidization of fertilizer production. Representatives of the power companies assert that immediately on the passage of the bill surveys for lines to Nashville and Memphis will be begun, as well as extensions to Mississippi and Louisiana.

Brooklyn Rates Come Down

Residential Consumers Receive Voluntary Reduction of Half a Cent per Kilowatt-Hour

UNDER the progressive leadership of its president, Matthew S. Sloan, the Brooklyn Edison Company signalized Christmas week by announcing a voluntary reduction in its maximum rate for electric service. Beginning on New Year's Day, residential consumers in that populous borough of the city of New York will pay 7 cents a kilowatt-hour instead of 7½ cents, thus saving approximately $1,500,000 a year, based on present consumption.

Two years ago the Brooklyn Edison made a similar reduction in rates, that time from 8 cents to 7½ cents, effecting a saving of about $1,000,000 a year to the community. Two months earlier, when it took over the electric business


ANOTHER VOLUNTARY CUT IN ELECTRIC SERVICE RATES

As our Christmas Greeting to the community we serve, we announce a reduction from 7½ cents to 7 cents a kilowatt hour in our maximum rate for electric service, effective January 1, 1927.

This Means a New Saving of

$1,500,000 a Year for the People of Brooklyn

Two years ago we announced a voluntary cut in our rates and stated our policy of sharing with you every benefit we can derive from better methods and more economical processes.

Once more we are happy to be able to say that because of economies effected in our operations, it now costs us less to furnish electrical service to you, and this benefit we share with you.

These cuts in rates, with a reduction in our Power rates made this year, mean a saving to our customers of

More Than $5,500,000 By the End of 1927

BROOKLYN EDISON COMPANY

M. S. Sloan

PRESIDENT

THIS "AD" WAS DISPLAYED AS A FULL-PAGE NEWSPAPER ANNOUNCEMENT

of the Flatbush Gas Company, it reduced the maximum rate in the Flatbush section from 9.8 cents a kilowatt-hour to 8 cents, making the rate uniform with the rest of the borough and saving $300,000 a year to the people of Flatbush, who profited further by the general reduction that followed on Jan. 1, 1925. A reduction in power rates has also been made in the last two years.

In announcing the latest reduction Mr. Sloan said:

"Brooklyn Edison is a service organization. We have a duty to the community, which is to give it the best possible electric service and give that service at the lowest possible rates. In other words, whenever by better methods we can achieve economies in our service costs, we must pass the benefits along to the people of Brooklyn in the form of lower rates.

"Brooklyn Edison has been paying a fixed rate of dividends on the investment in the enterprise for more than 25 years without a lapse. It is far beyond the experimental stage. It has long ceased to be an infant. It has now upward of $135,000,000 invested in plant and equipment. Its product is no longer a luxury; it is a necessity of modern life. Brooklyn Edison stands firmly on a solid foundation. As an electric service company, it is less subject than any other industry to the successive waves of economic change. If our company, being what it now is, failed to share with the community the benefits of every saving in costs that can be made by careful and far-sighted management, I should consider it a betrayal of public trust. Moreover, I am betraying no secrets of a competitive business when I say that the cheaper electric service can be furnished to the people, the more electric service will be used."

Alluding to the economies achieved in operating the new Hudson Avenue generating station, now rated at 231,000 kw., Mr. Sloan declared that the company would continue its march of progress and prophesied that there would be still other reductions in the local price of electrical energy. Full-page advertisements of the change in rates were printed in the metropolitan papers, several of which commented editorially upon the company's enterprise and public spirit.

New England Companies Make Rate Changes

Important changes in rates for residential service have recently been announced by several New England light and power companies. The Blackstone Valley Gas & Electric Company, Pawtucket, R. I., has established a combination rate of 10 cents net per kilowatt-hour for the first 5 kw.-hr. per 200 sq.ft. of floor space or fraction thereof; 5 cents for the next 100, and 3 cents for the excess. This rate establishes the single-meter standard for residential use and combines the advantages of two rates formerly in force. The Haverhill (Mass.) Electric Company has established a combination room and energy rate in its Newburyport division and has reduced its room rate in Haverhill 0.5 cent per kilowatt-hour on the first step. At Haverhill the new rate will be 11.5 cents for the first 3 kw.-hr. per room per month, 8 cents for the next 5 kw.-hr and 4 cents net for all excess. The steps at Newburyport will be 12, 10 and 5 cents.

A rate reduction of 1 cent per kilowatt-hour has been announced by the Pittsfield (Mass.) Electric Company, effective Jan. 1.

National Broadcasting Company Appoints Consultants

H. P. Davis, vice-president of the Westinghouse Electric & Manufacturing Company, has been elected chairman of the board of directors of the National Broadcasting Company. The board of directors has just established a board of consulting engineers to assist the National Broadcasting Company in problems of transmission and mechanical development. This board consists of Dr. Alfred N. Goldsmith, Radio Corporation of America, chairman; E. F. W. Alexanderson, General Electric Company, and Frank Conrad, Westinghouse Electric & Manufacturing Company.

Purchases and Mergers

Lawrence Gas & Electric Will Go to New England Power—Southeastern Consummates Charleston Sale

THE offer of the New England Power Association to purchase the Lawrence (Mass.) Gas & Electric Company, referred to in the ELECTRICAL WORLD for Dec. 4 (page 1184), has been accepted by the stockholders of the Lawrence utility.

Acquisition of the newly organized South Carolina Power Company (noted last week, page 1340) by the Southeastern Power & Light Company has been consummated. The latter will hold all the common stock of the consolidated concern, which will have a total capitalization of $20,000,000.

Joint petition has been made to the New York Public Service Commission to permit sale of the Union Springs Light & Power Company of Cayuga County and the Ledyard Lighting Company of Aurora, to the Empire Gas & Electric Company of Geneva. Both the companies first named have bought their electrical energy from the Empire Gas & Electric, which desires to issue $102,000 in 6 per cent preferred stock to provide funds for the purchase.

The Kentucky Utilities Company has purchased the electric distribution lines, waterworks system and ice-manufacturing plant at Clinton, Ky., from the Interstate Utilities Company. The purchasing company had previously supplied Clinton from its plant at Fulton, Ky.

Approval of purchase by the Interstate Public Service Company of Indianapolis of the Pine Village Light & Power Company for $10,367 has been given by the Indiana Public Service Commission. Purchase from H. F. Clevenger by the H. F. Clevenger Electric Company of electric property in Bartholomew County, Ind., at $24,861, including transmission lines between Columbus, Clay, Flat Rock and Rock Creek, was also approved by the commission.

Purchase of the light and power system at Addy, Wash., from Willett Brothers by the Stevens County Power & Light Company of Colville, Wash., became effective on Dec. 1. A small plant at Valleyford, Wash., was purchased by the Valleyford Water & Electric Company, a newly organized local concern.

The town of Isola, Miss., through its board of aldermen, has sold its light plant to the Mississippi Power & Light Company.

Perryton, Tex., has voted by twelve to one to sell the municipal electric light plant to the Inland Utilities Company for $60,000.

The Bradford (Pa.) Electric Company has bought the Port Allegany (Pa.) municipal electric plant.

Sale of the municipal light and power plant of Carrollton, Miss., to the Mississippi Power & Light Company is announced.

The Milan (Minn.) Light & Power Company and the municipal plant at Bellingham, Minn., have been sold to the Western Power & Light Company of Waconia, Minn.

Briefer News

New England N.E.L.A. Moves.—The offices of the New England Geographic Division of the National Electric Light Association have been moved from 149 Tremont Street to room 1113, Statler Building, 20 Providence Street, Boston.

Connecticut Company to Sell Energy to Railroad.—The Connecticut Light & Power Company has signed an agreement with the New York, New Haven & Hartford Railroad to furnish electric power to the latter from its Devon hydro-electric plant. The New Haven & Hartford needs additional power to that furnished from its own Cos Cob plant. President Irving Day of the Connecticut Light & Power Company has announced that tentative plans are now under way to construct a new power unit at Devon for this purpose. The auxiliary station will cost with equipment approximately $300,000.

Bethlehem Steel Company Takes Additional Niagara Falls Power.—The Bethlehem Steel Company of Lackawanna, N. Y., has increased the amount of Niagara Falls energy it purchases to a figure in excess of 26,000 hp. It is believed that this company will gradually eliminate the steam-electric station at its steel plant and come to depend entirely on Niagara service.

Kentucky Utilities Association Has Changed Date of Annual Meeting.—The Kentucky Utilities Association has announced that its annual meeting, originally scheduled for Jan. 18 and 19, will be held on Feb. 18 and 19, instead, with an afternoon meeting on Feb. 18, dinner and dance in the evening and a morning meeting on Feb. 19. R. F. Pack, president of the National Electric Light Association, and W. H. Sawyer, president of the American Railway Association, will be among the speakers.

Wilmington, N. C., Gets Improved "White Way."—Wilmington, N. C., served by the Tide Water Power Company, is rejoicing in the completion of an improved street-lighting system in its "white way" section. The "white way" as now equipped consists of 100 General Electric lamps of 10,000 lumens each in fourteen blocks on Front, Market and Princess Streets. The system compares favorably with that of any other city of Wilmington's size.

Pensacola Gets Coosa River Service.—Two thousand persons assembled in a Pensacola (Fla.) theater on Dec. 17 to take part in formal ceremonies in celebration of the advent of service from the Gulf Power Company, a subsidiary of the Alabama Power Company and thus part of the Southeastern Power & Light system. Increased industrial activity is expected to be built on this new source of electrical energy transmitted from the hydro-electric plants on the Coosa River.

New Transmission Lines for Washington Water Power Company.—Construction of a 110,000-volt transmission line from Brewster to Okanogan, Wash., was scheduled to be under way at the close of 1926 as a part of the system of the Washington Water Power Company, Spokane, to replace a 60,000-volt line between those two points. The line was raised from 33,000 volts last summer. Construction is contemplated of a 13,000-volt line from Pateros to Carlton, Wash., in the same section to serve an irrigated orchard district.

High-Tension Line to Be Built from Great Falls, Manitoba, to Winnipeg.—Work is under way for the building of a double-circuit, steel-tower, 160-mile transmission line, designed for an ultimate voltage of 110,000, between the Great Falls plant of the Manitoba

Coming Meetings of Electrical and Allied Societies

[A complete directory of electrical associations, with their secretaries, is published in this issue of the ELECTRICAL WORLD, page 80.]

American Engineering Council—The Mayflower, Washington, D. C., Jan. 13-15. L. W. Wallace, 26 Jackson Place, Washington.

Empire State Gas and Electric Association, Electric Section—New York Edison Auditorium, 44 West 27th St., New York, Jan. 14 and 15. C. H. B. Chapin, Grand Central Terminal, New York.

Northwest Association of Electrical Inspectors—Multnomah Hotel, Portland, Ore., Jan. 17 and 18. F. D. Weber, Box 745, Portland.

National Electrical Manufacturers' Association (Supply Division)—New York, Jan. 17-21. S. N. Clarkson, 30 East 42d St., New York.

National Electric Credit Association—New England Division, Boston, Jan. 18. F. P. Vose, 1008 Marquette Bldg., Chicago.

Western Association of Electrical Inspectors—Kansas City, Mo., Jan. 25-27. W. S. Boyd, 175 West Jackson Blvd., Chicago.

Electrical Supply Jobbers' Association, Pacific Division — Del Monte, Cal., Jan. 27-29. F. Overbagh, 411 South Clinton St., Chicago.

National Association of Lighting Equipment Dealers—Hollenden Hotel, Cleveland, Jan. 31-Feb. 5. G. P. Rogers, 424 Guarantee Title Bldg., Cleveland.

Northwest Electric Light and Power Association, Commercial Section, Multnomah Hotel, Portland, Ore., Feb. 10 and 11. L. A. Lewis, Washington Water Power Company, Spokane, Wash.

American Institute of Electrical Engineers—Midwinter convention, New York, Feb. 7-10; Southwestern District, Kansas City, March 17-18; Middle Eastern, Bethlehem, Pa., April 14-16. F. L. Hutchinson, 36 West 39th St., New York.

Kentucky Association of Public Utilities—Brown Hotel, Louisville, Feb. 18 and 19. E. F. Kelley, Louisville Railway Co., Louisville.

Oklahoma Utilities Association—Huckins Hotel, Oklahoma City, March 8-10. E. F. McKay, 307 Local Building, Oklahoma City.

Southwestern Division, N. E. L. A.—New Orleans, April 26-29. S. J. Ballinger, San Antonio Public Service Company, San Antonio, Tex.

Southwestern Public Service Association — New Orleans, April 26-29. E. N. Willis, 403 Slaughter Bldg., Dallas, Tex.

Power Company and the city of Winnipeg. It is hoped to have it in service by the fall of 1927. This construction follows the addition of a third 28,000-hp. unit at the Great Falls plant, bringing its total rating to 84,000 hp., one-half of the ultimate capacity. A fourth unit has been ordered for service next summer.

Association for Advancement of Science Meets at Philadelphia.—The fifth Philadelphia meeting of the American Association for the Advancement of Science and Associated Societies was held from Dec. 27 to Jan. 1, with the University of Pennsylvania, the American Philosophical Society and the Franklin Institute acting as hosts. At the opening session, on the evening of Dec. 27, Dr. M. I. Pupin, the retiring president, delivered an address on "Fifty Years' Progress in Electrical Communication." Among many notable contributors to the program were Dr. R. A. Millikan, Dr. W. R. Whitney and M. Luckiesh.

Dix River Dam Coming Up to Predictions.—For the first time since its completion in 1925 Herrington Lake is over the spillway at the Dix River Dam of the Kentucky Hydro-Electric Company's plant. Nearly 48 hours of steady rainfall in eastern Kentucky resulted in a rapid rise of water, putting some transmission lines temporarily out of service, but bringing Dix River Dam to its highest point of efficiency. This hydro plant generated 54,494,000 kw.-hr. in eleven months of 1926, with enough storage for 20,000,000 kw.-hr. more. The preliminary estimate of capacity before the dam was finished was 77,000,000 kw.-hr.

Projected Development on Thousand Islands River, Quebec.—An application has been received by the Hydro-Electric Power Commission of the Province of Quebec for permission to harness the Thousand Islands River, which runs almost parallel with the Ottawa River, north of Montreal. Difficulty, however, arises from the fact that to provide the necessary flow of water the channel would have to be bridged or four controlling dams erected at the four outlets of the Lake of Two Mountains. Should the Thousand Island Rivers project mature, it will mean the development of about 16,000 hp. and the expenditure of several million dollars.

Beatrice, Neb., Defeats Municipal Ownership Plan.—The voters of Beatrice, Neb., have defeated, by a vote of 2,052 to 1,945, the proposal to issue revenue bonds, to be a lien only upon earnings and not upon plant or city property generally, in a sufficient amount — estimated at $251,000 — to purchase by condemnation the plant of the Nebraska Gas & Electric Company with which the city plant is in competition in commercial lighting. The most effective argument against the plan was that it was an evasion of the state law limiting the amount of bonds a municipality may issue and made the sky the limit with respect to issuing securities on business activities of cities. This is the fifth election in recent years in Beatrice involving the control of energy supply.

Mine Service in Nevada.—Mining companies in Nevada, apprehensive of the lack of sufficient electrical power, have made informal complaint to the Nevada Public Service Commission against the Nevada-California Power Company. The mining companies contend that they "are all pumping water and have but a single source of power to depend upon, and all would become drowned out if the power were to fail for 48 hours, and some of them in less time." Asserting that "there is a Diesel power plant in Tonopah able and willing to take the entire power load in such emergencies, to light and protect the town, and to stand by the power company customers if the power company will stand by the Diesel plant," the complainants ask that such co-operation be brought about by action of the commission.

A New Year's Epitome of "Electrical World" History

The *Electrical World* (published under that name since 1883 and tracing its history back to 1874) is a consolidation of the *Electrical Engineer* (founded in 1882 as the *Electrician*) and the *American Electrician* (founded in 1896). Final consolidation under the title of *Electrical World* took effect on Jan. 1, 1906, the *Electrical World* and the *Electrical Engineer* having been acquired by the McGraw Publishing Company in 1899 and amalgamated as the *Electrical World and Engineer*, and the *American Electrician*, a McGraw monthly, having been absorbed seven years later.

The roster of past editors of the *Electrical World* includes Carl Hering, Louis Bell, W. D. Weaver, T. C. Martin and many other men prominent in the electrical industry—some, like those named, no longer living, and others, like C. O. Mailloux, A. S. McAllister, Frank F. Fowle, F. M. Feiker, D. H. Braymer and H. V. Bozell, still active in engineering and industrial service. William H. Onken, Jr., is now editor and L. W. W. Morrow managing editor. Other members of the staff are: Earl E. Whitehorne, commercial editor; Allen M. Perry, associate editor; G. F. Wittig, statistical editor; H. M. Cameron, financial editor; F. C. Wells, news editor; Eustace C. Soares, manufacturing and markets editor; T. P. Kindig, assistant editor; L. H. Church, assistant editor; Frank R. Innes, Western editor; H. S. Knowlton, New England editor; Walter C. Heston, Pacific Coast editor; R. L. Shepherd, Southern editor, and Paul Wooton, Washington correspondent.

Governor of Oregon Fails in Effort to Supersede Public Service Commission.—Unless authorized by a specific act of the Legislature or by vote of the people, the Attorney-General of Oregon is constitutionally inhibited from assuming the direction of inquisitorial proceedings in connection with the operation of public utilities, according to a ruling which has recently been made by the State Board of Control. This finding is the result of an application filed by the Governor for special funds to be used by the commonwealth's counsel to defray the expense of an investigation of utility-company operations, including those of electric light and power concerns. The Governor assigned as his reason for desiring an independent investigation a lack of confidence in the Public Service Commission of Oregon. Inasmuch as the Board of Control in that state outranks all other governmental agencies, the ruling in question is expected to insure that all future regulatory procedure will be confined to the Public Service Commission.

Specifications for Residence Lighting Equipment.—Specifications which may be employed by central-station members of the Association of Edison Illuminating Companies in selecting residence lighting equipment for sale to the public are now available in tentative form. These specifications have been prepared by a committee of the association which has had the assistance of a committee of the Illuminating Engineering Society in formulating the requirements for lighting characteristics. The specifications have been issued "for trial and criticism." They call for rating of residence lighting equipment with regard, respectively, to lighting qualities, construction and appearance. Under the first of these heads are included means for rating equipments with respect to light output and glare. Copies of these specifications may be had from the Electrical Testing Laboratories, Eightieth Street and East End Avenue, New York.

The Revocable-Permit Law in Oklahoma.—According to Associated Press dispatches, an effort will be made by certain members of the Oklahoma Legislature at the coming session to repeal the revocable-permit law passed in 1925. Friends of the law expect to show that it has been largely responsible for the unprecedented amount of utility construction and extension that have occurred in the state during the past year and that the act has also resulted in reductions of electric rates by several companies, has facilitated financing of utility projects and has widened the market for certain classes of public utility securities. The Public Service Company of Oklahoma and the Chickasha Gas & Electric Company are applicants to the Corporation Commission for revocable permits to replace franchises in all cities and towns in the state where these companies have franchise rights.

Manufacturers Predict Prosperity

Sustained Good Business with Keen Competition Is Forecast— Plant Investments in 1926 Are Cited as Best Proof of Industry's Confidence in Future

OVERPRODUCTION, overstocking, price manipulations and other factors which would retard business are absent and fundamental economic conditions are sound, according to the opinions of manufacturers in the electrical industry. The following cross-section of conditions in the industry were obtained at the request of the ELECTRICAL WORLD and they represent manufacturers virtually throughout the country. Sustained good business is predicted for 1927 and the industry believes that satisfactory sales and profits should continue. It is believed that the large volume of business anticipated will be coupled with highly competitive prices. Elimination of waste, reduction of costs and overhead and increased efficiency of production are stressed by manufacturers as particularly essential to profit-making. This economic condition, resulting in keen competition and which is forcing the electrical manufacturer to reduce costs, is not singular to the electrical industry, and the electrical manufacturer notes that this condition is at the same time creating a widening market for electrical apparatus by increasing present applications and developing new uses for electricity in order to increase efficiency of production in all industries. Nothing is seen on the horizon which will disturb business, and a number of manufacturers point to their plant investments in 1926 as conclusive proof of their confidence in 1927 and the years to come.

Otto H. Falk

President Allis-Chalmers Manufacturing Company, Milwaukee

The year 1926 has been a period of good conditions and activities in our company. During the latter part of the year there has been a slight slackening in certain lines as compared with the earlier period. Economic conditions, however, appear to be sound and, notwithstanding the slight tendency toward slowing up at present, there is a feeling of what might be termed conservative optimism. The general conditions appear to justify the expectations of a healthy volume of business for 1927, and if the year is not one of large industrial growth, there is reasonable ground to anticipate a period of sustained good business.

W. M. Carpenter

President American Crossarm & Conduit Company, Chicago

Our expectation is that 1927 will be a good year and reasonably profitable to people who work hard and keep their costs and overhead down. For ourselves, we aim at some increase in conservatism for 1927.

F. M. Bernardin

President B-R Electric Company, Kansas City, Mo.

Business in the Southwest during 1926, while comparing favorably in volume with that of 1925, was nevertheless disappointing in results owing to net operating income. In my opinion the year 1927 holds little encouragement for improvement by reason of changes now going on in the electrical industry.

Laurence Wilder

President American Brown Boveri Electric Corporation, New York

Fundamental conditions are sound and satisfactory sales and profits should in general continue throughout the year 1927. With a sane government assured and an ample supply of money large contracts are being entered into for equipment and construction. While the margin of profits on the business of the country as a whole may perhaps, as a result of competition, tend to decline, there is a spirit of efficiency abroad manifesting itself in the elimination of waste, the reduction of inventories, the introduction of labor-saving machinery and in other ways that will tend to support present business earnings. A good year is assured for manufacturers of electrical equipment, power-generating units and railway equipment.

J. C. Belden

President Belden Manufacturing Company, Chicago

The outstanding feature of 1926 was the combination of a large volume of business and highly competitive prices. I do not expect to see new high records established in 1927, but see no cause for immediate pessimism, and expect business in fair volume for the coming year.

W. C. Bryant

President Bryant Electric Company, Bridgeport, Conn.

We anticipate a highly competitive market in 1927 not only in the line of material but in all lines where the productive capacity is apparently so much in excess of requirements. The number of our employees and also the number of hours of operation this year are virtually the same as they were last year. The general volume of business in the electrical industry will be good.

Augustus D. Curtis

President Curtis Lighting, Inc., Chicago

Review of activities in the electric lighting field during 1926 satisfies me that interest in proper and improved methods of illumination is continuing to increase as never before. With such a prospect ahead we anticipate further progress and achievement for the new year. Our own organization is being broadened in several directions to meet this continually growing demand.

R. B. Benjamin

President Benjamin Electric Manufacturing Company, Chicago

Our business during 1926 showed considerable improvement over that of last year. We anticipate good sales during 1927.

Albert C. Lehman

President Blaw-Knox Company, Pittsburgh

The unfilled orders of this company are 40 per cent higher than they were a year ago at this time. We feel that the first half of 1927 will be equally as good, if not better, than the first half of 1926, and see nothing in the horizon which will disturb business in 1927.

R. J. Russell

President Century Electric Company, St. Louis

Our company has experienced a satisfactory year and does not now see any reason why business should not be at least duplicated during 1927.

A. Edward Newton

President Cutter Electrical & Manufacturing Company, Philadelphia

We have done a record business during 1926 and we think the outlook for the electrical industry excellent. The increasing acceleration of electrical development must of course slow down some time, but that time, in our judgment, is far off. All business, great and small, needs electricity, while to make and measure and distribute it will keep us all going unless we allow political blatherskites in Washington to get the upper hand.

James Burke

President Burke Electric Company, Erie, Pa.

The past year has been one of stabilizing volume following the spasmodic conditions of previous years. We expect sales in 1927 will be in about the same volume, but the lower prices already prevailing will require increased economies to assure fair return on plant investments.

H. C. Petty

Vice-President Crocker-Wheeler Electric Manufacturing Company, Ampere, N. J.

The demand for electrical machinery in 1926 has been good and fairly stable with no wide swings. The prospects for new business for 1927 are equally good, if not better. Economic pressure is forcing industrial plants that have not previously changed to electric drive to make that change. Improved methods of applying electric power to industrial and transportation problems are being sought continuously. We look forward confidently to 1927 for an increasing demand for electric motors.

B. L. Worden

President Cutler-Hammer Manufacturing Company, Milwaukee

At present we are not anticipating any marked change in business conditions during 1927 as compared with 1926. As far as our company is concerned we are satisfied with this year's business. It is our belief that the result was perhaps a little better than we had a right to expect. We believe that it will take an improved quality of goods and a more concentrated and continuous effort to maintain during 1927 the conditions obtaining during 1926.

E. G. Beichler

President Frigidaire Corporation, Dayton, Ohio

The coming year looks promising for business and industry which is well organized, soundly financed and is equipped to render prompt and satisfactory service. Changing habits and customs have developed new wants to be supplied and personal credits have grown to an extent adequate for gratification of those needs. With them, too, has grown a demand for proper service, which must be recognized. As reflected in our own business, we expect for the third consecutive time to double the installations of the preceding year.

J. M. Taylor

Vice-President Diamond State Fibre Company, Bridgeport, Pa.

Conditions indicate continued good business throughout the coming year and we are looking forward to the new year with confidence. We have booked large orders for our products in the electrical, radio and automotive industries. We do not anticipate any changes in raw material prices and we believe labor will continue high.

F. R. Fishback

President Electric Controller & Manufacturing Company, Cleveland

The past year was a good one for our company. We have noticed an increasing tendency to use automatic control, and particularly totally oil-immersed control. Our business in supplying automatic control for synchronous motor installations has also been steadily increasing.

B. F. Vreeland

President Douglas Fir Cross-Arm Company, Denver

The volume of cross-arm business was sufficient to show a fair percentage of profit to the manufacturer, but prices have not been satisfactory. We have received but few inquiries for 1927 delivery, and, so far as we are able to judge, believe that the business for 1927 will at least equal that for 1926. There has been a good demand for Western red cedar poles this year, I should judge 25 per cent over 1925, and I understand virtually all producers are stocking as many this winter as their crews can cut and produce.

Frederick Holmes

Secretary Duncan Electric Manufacturing Company, Lafayette, Ind.

Our last fiscal year proved the best but one in our history. It has long been prophesied that a reduction of building volume was just around the corner and we have been viewing it with concern for three years. Construction statistics might be interpreted as indicating that some setback will occur in 1927, and if this proves to be the case we will, of course, feel it. It is our opinion, however, that the desire for better housing is growing and that new building will proceed at a reasonably satisfactory rate for some years to come. We look forward to 1927 with hope and confidence.

E. H. Jacobs

General Manager Electrical Engineers Equipment Company, Chicago

We have had one of the most consistent years of good business in our experience and indications all point to an improvement of this in 1927 by at least 20 per cent. We expect a good, steady, consistent business in 1927.

A. H. Goss

President Electric Refrigeration Corporation, Detroit

The year 1926 was one of prosperity. This has been particularly true in the specialty merchandising fields. I believe 1927 will see a full acceptance of refrigeration as essential food protection for both domestic and commercial purposes. Our new plants, representing an investment of $5,000,000, and our enlarged sales and advertising program are the best evidence I can provide as to our faith in business conditions for next year, and for years to come.

Gerard Swope

President General Electric Company

In the electrical industry we are looking forward to the year 1927 with confidence that the high rate of business that has been done this year will be continued in the next. The electrical industry is fortunate in that new uses and new applications of electricity are constantly being made in the homes and in the workshops.

C. F. Norton

Vice-President and General Manager Howell Electric Motors Company, Howell, Mich.

Business for 1926 has been very good. Incoming orders have been of a good volume and uniformly steady. However, competition on prices has been very keen. For 1927 we see no reason now why business should not hold up at least to nearly the 1926 level, and undoubtedly the competitive situation will remain as keen as heretofore.

G. A. Hughes

President Edison Electric Appliance Company, Inc., Chicago

The year 1926 was the best business year in our history despite strong competition for the public's pocketbook both in and out of the appliance field. We expect that 1927 will be a good business year, except for some slackening in one or two major industries, but believe we are in for a long period of very gradual, though almost imperceptible, deflation and are working toward stabilization, as far as general business goes. In the particular zone of electrical appliances the situation will become more keenly competitive because of overcrowding in the manufacturing field.

G. E. Cullinan

Vice-President Graybar Electric Company, Inc., New York

In looking ahead at the next twelve months we can see no reason for pessimism or for prophesying downward trends. The electrical market is so new, so far from saturated, so pregnant with new devices to increase production and decrease labor in factory and home that a decrease in one field can be compensated for by an increase in another field. We in our company look for big things and a splendid year in the business of the distribution of electrical supplies in 1927.

J. A. Johnson

Secretary and Treasurer Kuhlman Electric Company, Bay City, Mich.

We are just closing a most satisfactory years' business. Our volume for 1926 will exceed that for any previous year, and while we have noticed a lull during the past few weeks, I consider this will be only temporary as fundamental conditions in the electrical industry were never better. We believe that business in 1927 will equal or exceed that of 1926.

T. O. Moloney

President Moloney Electric Company, St. Louis

The year 1926 was the best business year that our company has experienced both as to volume and profits. This business was secured form all parts of the United States, with no particular section predominating. The outlook for 1927 is very good. Our belief in the success of the future is shown by the erection of a new factory building which we expect to enter in the early part of 1927.

Claude L. Matthews

Vice-President and Treasurer W. N. Matthews Corporation, St. Louis

Our business in 1926 shows a sales increase of 14½ per cent despite price reductions. The second half of 1926 shows a material improvement in sales over the first half. We expect a decided increase in our business for 1927 and are making plans accordingly.

H. W. Bliven

Vice-President Harvey Hubbell, Inc., Bridgeport, Conn.

Business in 1926 was very satisfactory from a volume standpoint and we believe that 1927 will be as good as or even better than 1926.

J. F. Lincoln

Vice-President Lincoln Electric Company, Cleveland

The year will be one of challenge to all manufacturers. Those who are able to meet the challenge of lower costs, better products and better methods will reap the benefit. The methods of five years ago will not succeed now no matter how successful they were then, and those who can only meet the challenge with such methods will be eliminated. Never has methods and design advanced as in the last year and this rate of progress will be exceeded in 1927.

M. B. Nelson

President Long-Bell Lumber Company, Kansas City, Mo.

The growing distribution of electricity from central-station companies has increased the use of construction materials and our sale of creosoted pine poles during the past year has been far greater than in any previous year. We are looking forward to a continued increase in business during the coming year.

C. R. Durling

President Monitor Controller Company, Baltimore, Md.

The year 1926 has shown a satisfactory increase in gross business over previous years, and while our books are not yet closed for the year, the relation between net profits and gross business will be approximately in the usual ratio. As to 1927, I am firmly of the opinion that there is no fundamental cause which should result in a slowing down of business for that year. If there is a slowing down I believe it will be owing more to psychological, than to material reasons. I almost spelled the above word "cycle"-logical, as what I had in mind was that if business men throughout the country have the idea that the business cycle is due for a turn downward, there will undoubtedly be such a turn, but I do not feel that, at least so far as our line is concerned, there have been present the features of overproduction, overstocking, price manipulation, etc., which are the features that should control and bring about a retardation of business.

W. C. Robinson

President National Metal Molding Company, Pittsburgh

Electrical business has been very satisfactory during the past year and looks bright for 1927. The greatest problem facing the industry is the question of distribution.

F. B. Black

President Ohio Brass Company, Mansfield, Ohio

Our sales in 1926 were about 10 per cent ahead of those in 1925. We look for business in 1927 to be about the same as in 1926.

Jos. S. Thompson

President Pacific Electric Manufacturing Company, San Francisco

After a period of very active business during the first nine months of 1926 we have found that sales in the last quarter decreased. We believe power companies, which are our only customers, are taking up slack and, to use a military term, consolidating their gains and preparing budgets for a big construction program next year.

N. A. Wolcott

President Packard Electric Company, Warren, Ohio

The outlook for 1927 business appears good and we expect the volume will be about the same as in 1926.

R. V. Bingay

President Pittsburgh Transformer Company, Pittsburgh

The year 1926 has been a prosperous one for our company and I cannot see anything but a repetition of the prosperity in 1927. I believe that the remarkable results of last year are owing to the tremendous increase in the incomes of so many people in this country, greater than the amount they have learned to spend on living. As time goes on, no doubt the standard of living will be such that they will spend more closely to the incomes, and then and only then will the old cycle of booms and panics return. That this time is not yet reached is very clear to me and thus I have every belief in the continued tremendous prosperity and consumption, for such an enormous surplus for investment must in turn, of course, lead to production.

F. D. Van Winkle

Manager Post-Glover Division, Lake States General Electric Supply Company, Inc., Cincinnati

The prospects for 1927 are encouraging and the volume of business now in sight indicates a measure of activity which will compare favorably with 1926. During the last few months the demand for mining specialties has been gratifyingly large, with sufficient future business to insure production at a satisfactory rate during the first quarter of 1927.

B. W. Kerr

President Railway & Industrial Engineering Company, Greensburg, Pa.

Our 1926 business has, on the whole, been satisfactory. A considerable increase was made in sales but a very close competitive situation prevented a corresponding increase of net. Our negotiations on hand at present are greater in volume than at any previous time in our history, despite the fact that usually this is our slack time for negotiations. This situation, together with our knowledge of budgets which are being considered by the utility companies, lead us to believe that 1927 will be considerably in excess of 1926 in its requirements.

F. S. Hunting

President Robbins & Myers Company, Springfield, Ohio

Business in our branch of the electrical industry for 1926 has been a little better than in 1925, and that we believe that the prospects are such that we can reasonably expect 1927 sales will be about as good as they were in 1926. We do not fear any marked slump in business, and we are not anticipating any substantial increased business over 1926.

H. T. Dyett

President Rome Wire Company, Rome, N. Y.

The volume of business in the electrical wire and cable industry during the past year has been large, but there has been absolutely no inflation of prices and deliveries have been reasonably prompt at all times. The condition of the country at present is exceedingly prosperous, and, speaking for the electrical industry, we look for a good volume of business for some time to come, because of the increasing use of electricity in reducing production costs.

R. C. Lanphier

Vice-President and General Manager Sangamo Electric Company, Springfield, Ill.

During 1926 our business showed a healthy increase over the previous year. We are approaching the year 1927 with a feeling of confidence in the continued prosperity of the electrical industry and a sales possibility equal to or slightly in excess of the 1926 demand.

N. J. Conrad

General Manager Schweitzer & Conrad, Inc., Chicago

Our business during 1926 shows a very substantial and gratifying increase over that of 1925 and also over that of any previous year. Indications, as we see them, promise good business for at least the first half of 1927.

H. J. Blakeslee

President the States Company, Hartford, Conn.

Our 1926 business, with the exception of radio transformers, showed a decided increase over that of any previous year. We have every reason to expect excellent business in 1927.

E. B. Freeman

Vice-President B. F. Sturtevant Company, Hyde Park, Boston

Conditions indicate a strong revival of business in the spring and an excellent sales volume in 1927. Until there is decided unemployment electrical equipment will be in constantly greater demand.

H. D. Steele

President U. S. Electrical Manufacturing Company, Los Angeles

The year 1926 has been progressive, with keen competition that has acted as a stimulant to produce new developments in apparatus and new ways and means of merchandising. The same competitive stimulant will be present in 1927, with the best results occurring to those who are alive to improving their product, refining costs and developing economic distribution. The outlook as regards volume of business in 1927 seems satisfactory.

E. M. Herr

President Westinghouse Electric & Manufacturing Company

For the electrical industry 1926 has been a good but not an unusual year. There is every indication that the first half of 1927 will be equally as good. When we consider the comparative youth of this industry, its growth cov-

ering a bare half century, and the rapid strides it has made in that short period of time, its possibilities for expansion seem very great. With the strong and sound financial situation, the scientific development of industry along progressive lines, and the increasing attention to public service in every constructive way, the present period of prosperity should continue well into the new year.

E. F. Weston

President Weston Electrical Instrument Corporation, Newark, N. J.

Business conditions have been very satisfactory during 1926, our company having experienced its most successful year. We are looking forward with confidence to 1927 and believe that conditions will be about the same as in 1926.

Louis Larsen

General Manager Sundh Electric Company, Inc., Newark, N. J.

Our business for the year 1926 was about 35 per cent better than it was in 1925. We feel that 1927 will be just as good a year if not better than 1926.

P. B. Postlethwaite

President Wagner Electric Corporation, St. Louis

Sales of our standard lines during 1926 were slightly in excess of those in 1925. Orders received during the last quarter of 1926 are approximately 10 per cent greater than orders received in the last quarter of 1925. Indications are that the volume of our 1927 business in electrical apparatus will be larger than that of 1926.

N.E.M.A. Plans for 1927

To Analyze Conditions Underlying Prosperity and Formulate Policies to Insure Its Continuance

By ALFRED E. WALLER
Managing Director National Electrical Manufacturers' Association

THE National Electrical Manufacturers' Association begins the year 1927 with unusual prospects for activity and usefulness. Its position is unique in the opportunity which is afforded to preserve the best traditions of the organizations that combined to form its membership and at the same time to mold its plans and bring its methods of operation into full accord with the most modern practice and the experience of other organizations which have achieved success in similar lines. The most important function of any trade association is the promotion of confidence and a spirit of co-operation both within its membership and in its relation to other organizations functioning along different lines for the benefit of their respective industries and the public welfare. The splendid foundation of past achievement by the membership of the N.E.M.A. in this connection is rich with promise of greater and better things.

Much careful thought has been given to the major policies relating to the qualifications for membership in the association. This has been promoted by the interest shown both by individual manufacturers and by organized groups. In general terms, the standard by which eligibility to membership will be measured is the mutual benefit to be derived by the prospective member and by the association. The fundamental requirement is that there shall be sustained mutual advantage in the relationship. From time to time conditions arise in which a temporary coincidence of interest between the association and other organizations or groups may exist. In all cases of this kind it will be the policy of the National Electrical Manufacturers' Association to assist in any consistent manner.

Among the activities of the association for the coming year none is more important than its program for promoting the collection and dissemination of statistics in the electrical industry. Considerable progress has been made already, and statistics of several lines of apparatus and supplies are now compiled regularly by the association. Substantial expansion of this work is expected in the near future. The work of the association's committee on uniform cost accounting, which has been an important influence for more than ten years and has been of immense value to the electrical manufacturing industry, will be still further extended. The goal is to have all the members of the industry speak a common language in matters which relate to cost accounting.

There will be close co-operation with the various departments of the United States government in lines where the association can render service, as well as co-operation with other organizations in matters of common interest. The unexampled prosperity of our country at the present time makes this a most opportune period in which to investigate and to analyze the fundamental conditions which underlie this prosperity and to formulate broad policies to insure its continuance. To this end the National Electrical Manufacturers' Association is pledged and extends most cordial greetings for the new year to its sister organizations and to the industry as a whole.

Business Prospects for Specialty Manufacturers

By H. W. YOUNG
President Delta-Star Electric Company, Chicago

Two governing factors stand out in a consideration of the reasons underlying the optimism that exists in my mind regarding the business prospects for manufacturers of electrical specialties. During the past two years there has been a marked tendency on the part of power companies to build to a higher standard, and the demand on manufacturers to build better and ever better is a sign of real progress and lasting prosperity. This avenue opened to the specialty manufacturer will result in better business if he continues to develop with the industry and always keeps just ahead.

The tying together of public utilities for the interchange of power has had a great influence in raising the standards. The operating conditions of the smaller companies now more nearly equal those of larger companies, and electrical equipment classed as satisfactory under the old conditions is not adequate today. No matter what kind of equipment we consider, regardless of how large or how small, the power companies' system, as far as continuity of service is concerned, is only as good as its weakest part. This condition coming upon the industry almost overnight has made it more and more necessary to determine by laboratory research many things simply taken for granted five years ago. The time has passed for any guesswork, and with the splendid co-operation existing between engineers and manufacturers we can all feel sure that equipment will keep pace with the exacting requirements that the operator does and must insist upon.

We thus have a healthy condition which must continue until we have at least caught up with ourselves. Will this ever be? Who can tell?

Over Half a Billion Lamps Sold in 1926

More than 500,000,000 incandescent lamps were sold during the year 1926, about 60 per cent of them large ones used on lighting circuits and 40 per cent miniature lamps. This is shown by data supplied by the engineering department of the National Lamp Works of the General Electric Company.

INCANDESCENT ELECTRIC LAMPS SOLD IN THE UNITED STATES

Year	Quantities in Thousands: Large Lamps	Miniature Lamps	Total
1908	63,745	1,821	65,566
1909	73,257	2,319	75,576
1910	79,943	3,814	83,757
1911	86,652	4,065	90,717
1912	85,469	5,379	90,843
1913	105,066	12,442	117,509
1914	112,951	14,582	127,533
1915	116,127	23,713	139,840
1916	150,491	50,194	200,685
1917	179,326	74,890	254,216
1918	181,020	72,556	253,577
1919	180,675	85,657	266,332
1920	204,829	118,146	322,975
1921	168,589	99,708	268,297
1922	210,209	129,470	339,679
1923	245,874	174,574	420,448
1924	262,636	188,329	450,965
1925	279,231	199,641	478,872
1926*	311,000	220,000	531,000

* Estimated from data for first ten months.

Meanwhile the sizes have been gradually increasing. In the days of the carbon lamp the average watts per lamp sold were high. They fell to 47 in 1913, when the tungsten lamp came into general use. Since that year the figure has regularly increased. In 1925 it was 57.6 watts per lamp and growing at the rate of about 1 watt each year. The average lumens per lamp increased from 170 in 1890 to 382 in 1914 and 712 in 1925.

Electrical Patents

Announced by U. S. Patent Office

(Issued Nov. 23, 1926)

1,608,256. VENTILATING-ROTOR CONSTRUCTION; P. Suter, Baden, Switzerland. App. filed Jan. 25, 1926.

1,608,267. ARC DEVICE; J. Force, Livingston, N. J. App. filed March 1, 1922. In which an arc is operated in a gaseous atmosphere between electrodes of which either the negative electrode alone or both electrodes operate at incandescence.

1,608,268. ELECTRICAL DISCHARGE DEVICE AND METHOD OF OPERATION; C. G. Found and I. Langmuir, Schenectady, N. Y. App. filed Sept. 18, 1924.

1,608,278. DEMAND METER; C. I. Hall, Fort Wayne, Ind. App. filed Jan. 8, 1923.

1,608,286. SINGLE-UNIT ELECTRIC GENERATING PLANT; E. F. Andrews and R. E. Acre, Chicago, Ill. App. filed Feb. 12, 1917. Cooling system employed where an electric generator and an internal-combustion engine are used.

1,608,289. FUSE-CLIP CLAMP; E. A. Bacon, Stillwater, Minn. App. filed Nov. 10, 1924.

1,608,297. TROLLEY; G. W. Bower, Schenectady, N. Y. App. filed Nov. 18, 1921. For trackless-trolley system.

1,608,305. THERMOSTATICALLY OPERATED ELECTRIC SWITCH; G. K. Culk, Jr., G. D. Barker and W. J. Sturgis, Dowagiac, Mich. App. filed Nov. 26, 1924. Electric switch controlled by a thermostatic bar so formed as to exert its operating force in an approximately direct line, and, further, to provide means for controlling such a switch, which shall act with equal promptness in the various positions in which the parts of the device may be.

1,608,314. FIELD-POLE AND ROTOR CONSTRUCTION; C. T. Hibbard, Minneapolis, Minn. App. filed Oct. 2, 1922. Revolving-field pole pieces, such as are commonly used in the construction of rotors for electric motors and generators; it is more particularly adapted for use in such electric machines operating at a very high speed.

1,608,315. STORAGE-BATTERY PLATE; W. E. Holland and J. M. Skinner, Philadelphia, Pa. App. filed July 21, 1922.

1,608,321. APPARATUS FOR ARC WELDING; W. Kassteen, Amsterdam, Holland. Means whereby welding may be done with any electric plant without the use of a special dynamo.

1,608,360. CONTROL SYSTEM; H. L. Blood, North Plainfield, N. J. App. filed Aug. 4, 1923. For operating machine tools and particularly to control systems for operating planers.

1,608,426. CONTROL SYSTEM; R. H. Rausch, Plainfield, N. J. App. filed Aug. 4, 1923. For governing the operation of planers and other machine tools of like character.

1,608,469. STORAGE-BATTERY PLATE; W. H. Daniel, Memphis, Tenn. App. filed March 19, 1926.

(Issued Nov. 30, 1926)

1,608,494. TERMINAL FOR BATTERIES AND THE LIKE; C. P. Deibel, Youngstown, Ohio. App. filed Feb. 19, 1923.

1,608,578. CONNECTOR; A. E. Buchenberg, Toledo, Ohio. App. filed Sept. 9, 1918. For wire terminals.

1,608,579. DRY CELL; C. F. Burgess, Madison, Wis. App. filed Sept. 11, 1923. The combination of a dry-cell electrode cup having a bead near its open end, a carbon rod within the cup, a core encircling the rod, a flat washer resting on the bead and making a tight fit with the carbon rod, the washer being spaced from the top of the core to form an air space in uninterrupted communication with the core and into which gases may pass freely, the upper edge of the cup being crimped over the edge of the washer to make an air-tight closure.

1,608,582. ELECTRIC SWITCH; J. A. Cole, Chicago, Ill. App. filed June 27, 1925. High-current-carrying switch; quick-action type.

1,608,594. METHOD OF OPERATING ELECTRIC WELDING APPARATUS; J. E. Granger, Alhambra, Cal. App. filed Aug. 12, 1922. Consists in providing a number of low-potential current-output elements in multiple in a welding-current circuit and in cutting out enough elements to cause the remainder to be worked at a high current output, which will cause them to have any desired drooping-voltage characteristic.

1,608,610. ELECTRIC SWITCH; F. H. Meyer, Grand Rapids, Mich. App. filed Oct. 1, 1925. Limit switch; screw-travel type.

1,608,613. ELECTRIC MOTOR; A. E. Oswald, Bogota, N. J. App. filed Nov. 30, 1920. Means for varying the speed of an alternating-current-commutator motor at will. A commutator is used to connect the rotating armature in series with certain auxiliary coils, which may be stationary. The field coils, however, preferably, are connected in long shunt across the voltage-supply mains. Fluctuation in speed of the motor is substantially regulated by means of a relationship between the field coils and the auxiliary coils. Regulation of the speed may be secured at will by effecting certain alterations in the relationship between the field coils and the auxiliary coils.

1,608,615. CIGARETTE DISPENSER AND LIGHTER; L. Pengilly, Stockton, Cal. App. filed Feb. 5, 1923.

1,608,621. ELECTRICAL CONDUIT SYSTEM; J. Sachs, Hartford, Conn. App. filed April 26, 1920. Connection facilities for outlet boxes.

1,608,623, 1,608,624. BATTERY LINER; A. W. Schorger, Madison, Wis. Apps. filed Nov. 22, 1923, and Oct. 2, 1924.

1,608,642. FUEL-FEEDING MACHINE; S. Witten, Louisville, Ky. App. filed July 15, 1925. Means for feeding coal or other solid fuel from overhead bunkers to hoppers arranged in front of the boilers.

1,608,677. MAGNETIC CHUCK; J. E. Sederholm, St. Paul, Minn. App. filed Aug. 2, 1924. Designed particularly to hold and support a plurality of metallic articles such as castings and the like, while being ground or machined; adapted to be mounted upon the usual reciprocating work table of an ordinary surface grinder.

1,608,694. CORROSION-RESISTANT ARTICLE AND METHOD OF MAKING THE SAME; J. R. Cain, Washington, D. C. App. filed Aug. 10, 1925. An article of manufacture comprising a base metal of the kind known as stainless steel or iron having a corrosion resistant coating possessing the properties of chromium.

1,608,697. ELECTRIC MOTOR FRAME; R. E. Jacobs, San Francisco, Cal. App. filed Aug. 14, 1924. Mounting means for the motor of a motor-driven vehicle such as an electric locomotive or a street-railway car.

1,608,706. ELECTRODEPOSITION OF METALS; C. P. Madsen, New York, N. Y. App. filed April 26, 1919. Method and means of electrodepositing metals, particularly the "nickel metals."

1,608,732. ELECTRIC TRAIN-LINE COUPLER; C. C. Farmer, Pittsburgh, Pa. App. filed Nov. 29, 1921.

1,608,757. RHEOSTAT MECHANISM; C. Aalborg, Pittsburgh, Pa. App. filed March 23, 1920. Motor-operated rheostat mechanisms. The various contact terminals are arranged in concentric circles and a rotatable contact arm is provided with brush members which engage the contact members. The brush members are so supported on the contact arm as to be movable perpendicularly into engagement with the contact members. Spring members are provided for biasing the brush members into engagement with the contact members. A stop member is provided in the path of the contact arm for limiting the movement of such arm. A motor is supported along the axis of rotation of the contact arm and is mechanically connected to such arm by a worm-gear mechanism and an overrunning clutch. The overrunning clutch permits the free rotation of the motor when the contact arm engages the stop member. The leads which are connected to the motor are preferably carried through a base plate of the device and through the supporting member for the motor at the center of rotation of the contact arm.

1,608,761. SPEED-REGULATOR SYSTEM; J. H. Ashbaugh, Pittsburgh, Pa. App. filed Dec. 4, 1924. For governing the speed of direct-current motors. A system that is responsive to load changes upon the motor and having means for momentarily forcing the field strength of the motor before the regulator has had sufficient time to correct for a change in speed or in load upon the motor. Using a motor-operated rheostat in the field circuit of the controlled motor, reversing switches to cut resistance temporarily in or out of the motor-field circuit while the rheostat is in operation, and regulator means for controlling the reversing switches.

1,608,764. ELECTRIC FIRE; H. H. Berry, London, England. App. filed Oct. 28, 1924. In which imitation fuel is illuminated by electric lamps placed under or behind it and with which one or more electric resistances or other heat-producing agent may be employed.

1,608,782. ELECTRIC RANGE; K. Ehrgott, East Pittsburgh, Pa. App. filed Jan. 27, 1925. Having a removable main or cover platform for the stove portion of an electric range.

1,608,786. ELECTROMAGNETIC DEVICE; C. J. Fery, Paris, France. App. filed April 18, 1925. An electromotive device for electric clocks with motor pendulum.

1,608,792. CONTROL SYSTEM; G. W. Huey, Wilkinsburg, Pa. App. filed July 30, 1920. Slip regulator for controlling main motors for steel mills. A system of motor control which shall prevent the starting of a main motor before the full starting resistance is in series with the secondary winding and which shall automatically change the resistance in series with the secondary winding of the main motor in accordance with the current in the primary-winding circuit. To provide a torque motor for so regulating the starting resistance in series with the secondary winding of the main motor that the resistance shall be reduced slowly until the main motor has attained a certain speed and, afterward, the remaining resistance shall be removed at a greater speed. A control system which shall open the circuit breaker for the primary circuit of the main motor during underload or other abnormal conditions and shall prevent its closing until full starting resistance has been inserted in series with the secondary winding of the main motor.

1,608,798. CIRCUIT INTERRUPTER; J. B. MacNeill, Wilkinsburg, Pa. App. filed July 30, 1920. Of the panel or switchboard type; air-break. A circuit interrupter that shall utilize the arc forces attending the opening of a circuit to reduce the arcs, thereby reducing the amount of arc gases, prolonging the life of the contact members.

1,608,799. MERCURY-ARC RECTIFIER; E. Marschner, Weissensee, near Berlin, Germany. App. filed Oct. 26, 1923. With the leading-in device made of sheet metal consisting of different metal layers. Preferably bimetal, consisting of a layer of iron and a layer of copper or of a layer of nickel and a layer of copper, is employed, the copper layer of the cap contacting with the glass of the vessel and the iron or nickel layer being turned toward the mercury in the rectifier.

1,608,801. FURNACE-CONTROLLING MECHANISM; T. Masel (deceased), East Alton, Ill. App. filed Sept. 21, 1922. Especially for such furnaces as may be used for melting brass and other metals and pouring the same into molds.

1,608,817. ELECTRICAL TACHOMETER; H. O. Russell, Detroit, Mich. App. filed March 9, 1922.

1,608,819. CROSSING FOR TROLLEY CONDUCTORS; W. Schaake, Pittsburgh, Pa. App. filed Dec. 29, 1925.

1,608,825. FUSIBLE SEPARATOR FOR ELECTRO-PERCUSSIVE WELDING; C. F. Wagner, Pittsburgh, Pa. App. filed March 30, 1921. A welding system comprising two electrodes movable relatively to each other, a fusible member separating the electrodes, means for securing a predetermined gap between the electrodes in the course of electrode travel and means for securing engagement between the electrodes.

1,608,826. MOTOR-CONTROL SYSTEM; C. C. Whittaker, Pittsburgh, Pa. App. filed March 15, 1922. For systems that are subjected to comparatively heavy regenerative currents, such, for example, as electrical distribution systems for railway locomotives.

1,608,872. TEMPERATURE COMPENSATION; C. T. Wallis, Rochester, N. Y. App. filed May 7, 1923. Compensation of electromagnetic instruments for the effect of temperature-changes.

1,608,899. ELECTRIC SADIRON; F. H. Mayer, Salem, Ore. App. filed Oct. 18, 1922. Adapted to be heated by electricity, having a plurality of independent heating circuits and means of thermostatic control.

1,608,900. ELECTRIC SWITCH; F. H. Mayer, Salem, Ore. App. filed Jan. 3, 1925. Device for the making and breaking of an electric circuit through separable contact terminals, with means for ensealing such contact terminals in a deoxygenized atmosphere; that is to say, in a vacuum or in a properly confined volume of gas that is substantially free of oxygen.

1,608,936. INCANDESCENT LAMP; T. R. Harrison, Philadelphia, Pa. App. filed July 5, 1924. Primarily devised for use in an optical pyrometer of the portable type.

1,608,949. SOLDERING IRON; C. T. Mason, East Orange, N. J. App. filed Aug. 2, 1924.

1,608,973. ELECTRIC CLUSTER LAMP; G. A. Boomer, Waterbury, Conn. App. filed July 6, 1925.

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Printed in the First Issue of Each Volume

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Business Facts for Electrical Men

Selected Statistics Presented Graphically for the Use of All Interested in Analyzing the Trend of the Electrical Business

North Central States Show Rate of Customer Increase Close to National Average

CONTINUING the study of growth in number of customers during 1926 begun in a previous issue, which dealt with the Northeastern States, there is presented herewith a similar chart for companies in the East North Central States. As before, they are divided into several groups—those having less than 10,000 customers, those having between 10,000 and 50,000, and the larger companies either operating in important urban centers or having such centers as nuclei of more extensive systems. Those here charted serve altogether about 2,800,000 customers in Ohio, Indiana, Illinois, Michigan and Wisconsin. Cases involving appreciable expansion of territory have therefore been excluded.

In the group consisting of the thirteen small companies there is the widest variation in the change in number of residential customers, which ranges from an increase of 21.6 per cent to a decrease of 3.4 per cent; the mid-point of the group is Company No. 7, which enjoyed an increase of 5.9 per cent. An odd lack of consistency is apparent between the changes in the three different classes of consumers. Company No. 6 is a good example.

The throwing of a comparatively small number from one category to the other would account for abnormal gains and losses.

This case serves as well as any to illustrate the futility of hanging fine-spun computations on reported numbers of any specific class of customers. The fact is that these classifications are essentially estimates. The only positive figure that can be given by many companies is the total number of accounts on their books.

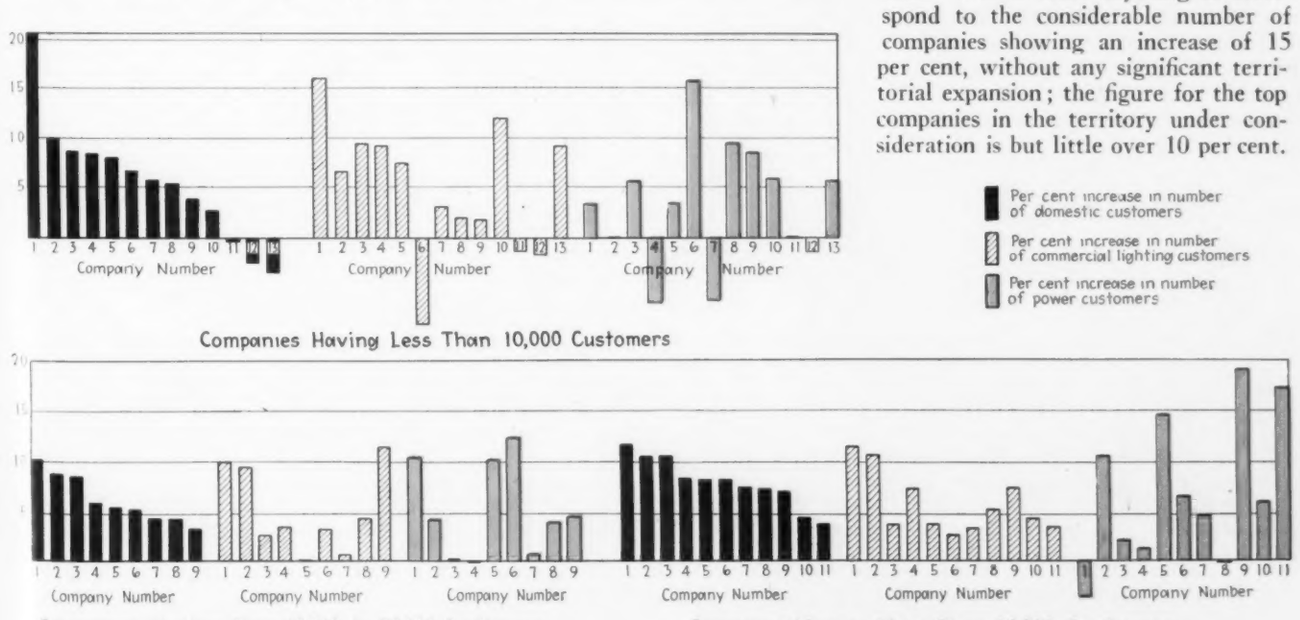
Another evidence of this uncertainty comes in the widely different proportions of the three classes reported by companies in substantially similar districts. They show commercial customers range from 10 to 50 per cent of the domestic, with power customers swinging far from the usual 2 to 4 per cent.

In the second group, consisting of nine companies having between 10,000 and 50,000 customers, the variations are less erratic. The increase of domestic customers ranges between 3.3 and 10.2 per cent, centering on 5.5; the commercial lighting from 0 to 11.7, and the power customers from 0 to 12.5. Here again, except for Company No. 1, there appears to be little connection between the increases for the three groups; the company with the smallest increase of domestic customers stands highest in new commercial lighting and ranks fourth in power.

The largest companies show the greatest relative gains; half of them increased their domestic customers by 8.1 per cent or more. In this group alone there is at least a rough parallel in the two trends for lighting, but no apparent relation between these and the figures for power.

In the Middle West, as in the East, the greatest gains seem to have been made in the large cities, but they run considerably lower in magnitude, the ruling figure being about 8 per cent, whereas in the East it exceeded 12 per cent. Nor is there anything to correspond to the considerable number of companies showing an increase of 15 per cent, without any significant territorial expansion; the figure for the top companies in the territory under consideration is but little over 10 per cent.

Most of the data for statistics in the ELECTRICAL WORLD are gathered by it from original sources. Privilege is freely given to readers of the ELECTRICAL WORLD to quote for use these statistics for any legitimate purpose. While there is no requirement that the source of data be given, yet it would help the ELECTRICAL WORLD in obtaining and compiling further basic information if those who make use of these statistics would give credit to the ELECTRICAL WORLD.


Per cent increase in number of domestic customers
Per cent increase in number of commercial lighting customers
Per cent increase in number of power customers
Company Number
Companies Having Less Than 10,000 Customers
Companies Having From 10,000 to 50,000 Customers
Companies Having More Than 50,000 Customers

Increase in Number of Customers of Typical Central-Station Companies in the East North Central States

Curtailed Industrial Activity in the North Central States

THE month of November witnessed a material decrease in the activity of the manufacturing plants of the North Central States. Not only was this true in respect to October, but November operations of this year were materially under those of November last year, though still above the monthly average for the past three years. Decreased activity during November was to be expected in some of the most important industries of the section, but the curtailment in operations exceeded the normal seasonal decrease to a considerable extent. Such is the November condition of industry in the North Central States as indicated from reports on electrical energy consumption by about four hundred manufacturing plants scattered throughout the section and in various industries.

The returns received by the ELECTRICAL WORLD indicate that November general industrial productive activity in the North Central States was about 10.5 per cent under October and 11.5 per cent under September. November operations of this year were also about 8.5 per cent under November of last year, but were still 3.0 per cent above the monthly average for the past three years. This is the first month in which the index of activity has fallen below that of the same month of the previous year since April, 1925.

This material curtailment in the operations of the manufacturing plants of the North Central States is due in large part to the more than seasonal curtailment in automobile production which has been under way since last August. The November operations of the automobile plants were about 18 per cent under those of October and almost 25 per cent under November last year. The operations of these plants have decreased by about 35 per cent since last August.

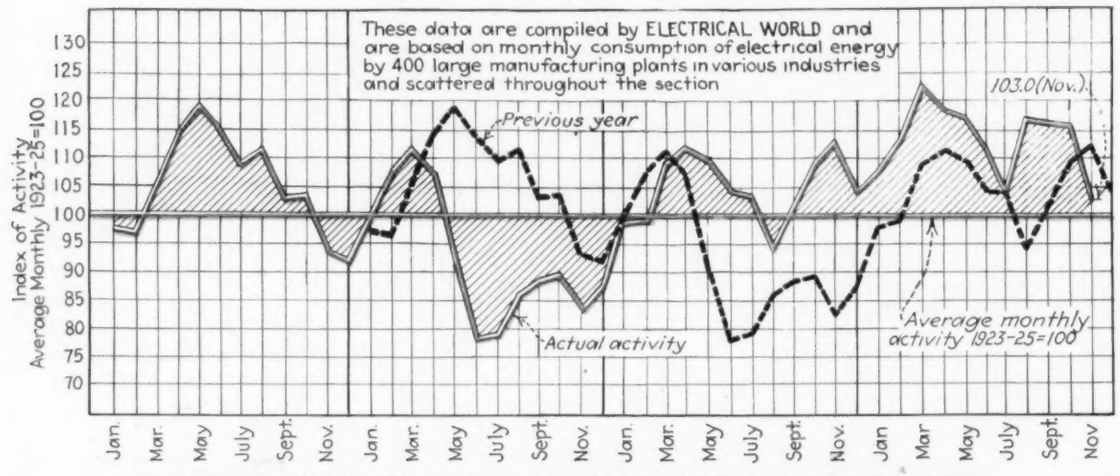
The metal industries also recorded a material drop in operations, the index figures decreasing from 126.0 in October to 109.4 in November, a decrease of about 13 per cent. The November operations of the metal industries in the North Central States, however, were still about 18 per cent over those of November last year and 9.4 per cent above the monthly average for the past three years.

Both the paper and lumber industries recorded slightly increased operations during November.

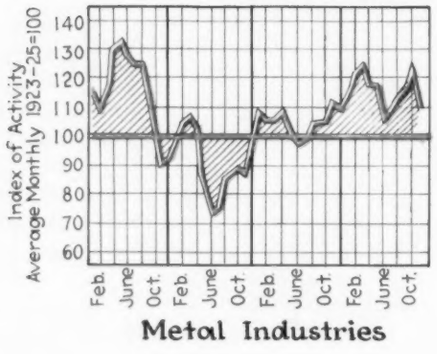
"Electrical World" Barometer of Industrial Activity in the North Central States

(Data Unadjusted for Seasonal Variation)

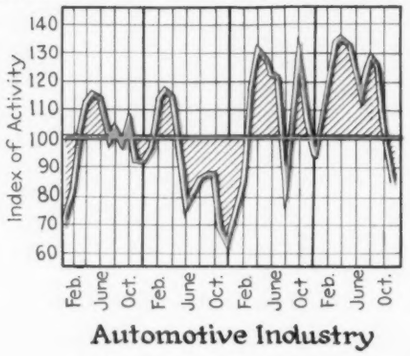
States in North Central Group—Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska and Kansas


These data are compiled by ELECTRICAL WORLD and are based on monthly consumption of electrical energy by 400 large manufacturing plants in various industries and scattered throughout the section
103.0(Nov.)
Previous year
Actual activity
Average monthly activity 1923-25=100
Index of Activity Average Monthly 1923-25=100
130 125 120 115 110 105 100 95 90 85 80 75 70
Jan. Mar. May July Sept. Nov. Jan. Mar. May July Sept. Nov. Jan. Mar. May July Sept. Nov. Jan Mar May July Sept. Nov

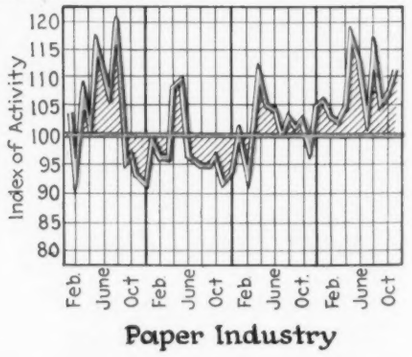
GENERAL INDUSTRIAL ACTIVITY IN THE NORTH CENTRAL STATES


Index of Activity Average Monthly 1923-25=100
140 130 120 110 100 90 80 70 60
Feb. June Oct. Feb. June Oct. Feb. June Oct. Feb. June Oct.

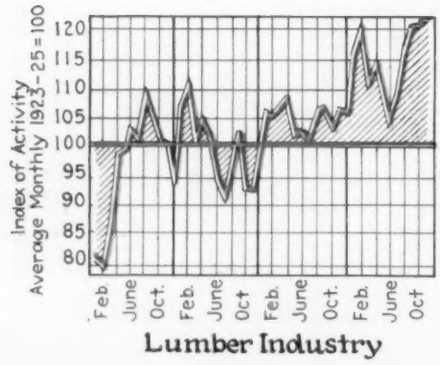
Metal Industries



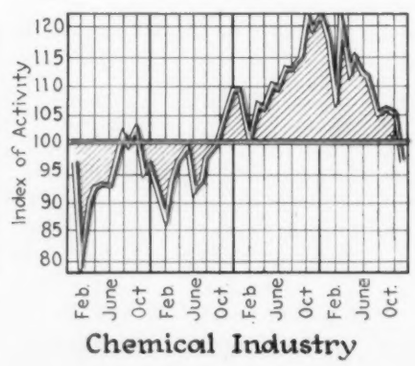
Automotive Industry



Paper Industry


Index of Activity Average Monthly 1923-25=100
120 115 110 105 100 95 90 85 80
Feb June Oct. Feb. June Oct Feb. June Oct. Feb. June Oct

Lumber Industry



Chemical Industry

Textiles Industry